Railway Mechanical Engineer
JUN 9 1941
June 1941
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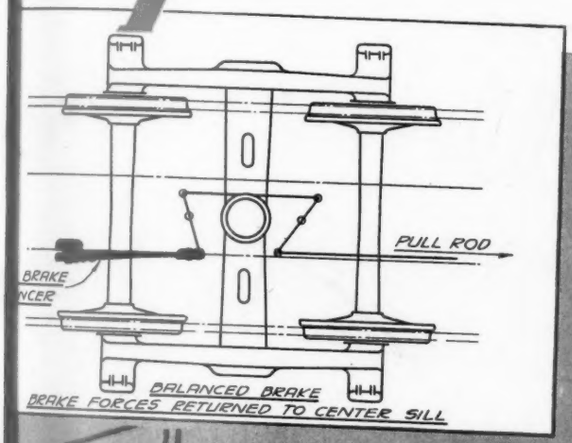
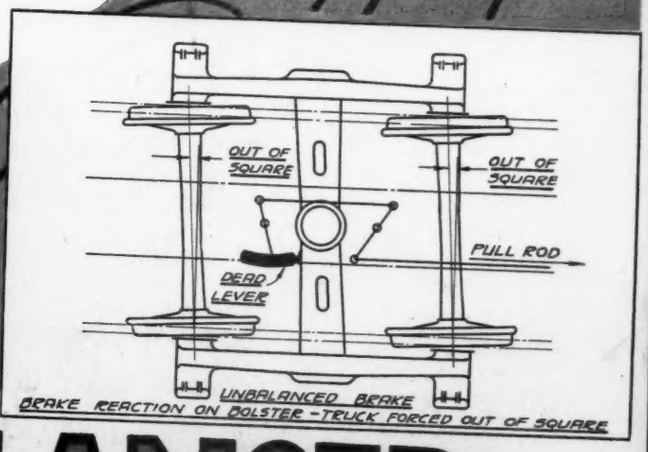
Transportation Library

Equalized brakes



WHEEL MILEAGE INCREASED



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BRIDGEPORT, CONNECTICUT

RAILWAY MECHANICAL ENGINEER

Founded in 1832 as the American Rail-Road Journal

With which are also incorporated the National Car Builder, American Engineer and Railroad Journal, and Railway Master Mechanic. Name Registered, U. S. Patent Office.

Volume 115 *No. 6*

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Editor, New York

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E. L. Woodward
Western Editor, Chicago

H. C. Wilcox
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C. L. Combes
Associate Editor, New York

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JUNE, 1941

Mechanical Division Meeting — June 19 and 20

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Published on the second day of each month by

Simmons-Boardman Publishing Corporation

1309 Noble street, Philadelphia, Pa. Editorial and Executive Offices: 30 Church street, New York, and 105 West Adams street, Chicago. Branch offices: Terminal Tower, Cleveland; 1081 National Press bldg., Washington, D. C.; 1038 Henry bldg., Seattle, Wash.; 550 Montgomery street, Room 805-806, San Francisco, Calif.; 530 W. Sixth street, Los Angeles, Calif.

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Subscriptions (including, when published, the daily editions of the Railway Age, published in connection with the convention of the Association of American Railroads, Mechanical Division), payable in advance and postage free, United States, U. S. possessions and Canada: 1 year, $3; 2 years, $5. Foreign countries, not including daily editions of the Railway Age: 1 year, $4; 2 years, $7. Single copies, 35 cents. Address H. E. McCandless, circulation manager, 30 Church street, New York.

The Railway Mechanical Engineer is a member of the Associated Business Papers (A. B. P.) and the Audit Bureau of Circulations (A. B. C.), and is indexed by the Industrial Arts Index and also by the Engineering Index Service. PRINTED IN U. S. A.

Jones & Lamson Turret Lathe

The above Illustrated Machine is also equipped with three JONES & LAMSON Die Heads and a pneumatic chuck.

PRODUCES ALL THE BOLTS WHICH FORMERLY REQUIRED FOUR UNITS

JUST recently installed in a large railroad shop this No. 7-D JONES & LAMSON Turret Lathe is refunding the investment at a very rapid rate.

Before its installation, two portable lathes were kept busy on frame bolts and frequently had to be assisted by another lathe in order to meet the production requirements.

The new JONES & LAMSON Turret Lathe not only produces all of the frame bolts but also turns out all the crosshead bolts and miscellaneous bolts that used to keep a fourth unit busy.

In addition to the taper attachment, the 7-D Universal Turret Lathe has many exclusive features which insure *maximum* precision and increased hourly production. Why not have JONES & LAMSON engineers make a study of your turret lathe requirements? Their survey will show the way to big savings in the cost of locomotive repairs.

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SPRINGFIELD, VERMONT

Manufacturers of: Ram and Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and Chasers.

IN the year which has elapsed since the last annual meeting of the Mechanical Division there has been a tremendous change in the tempo of our National Defense program. Our defense needs now so far exceed our reserve capacity of trained labor, of plants, machines and materials that we are definitely facing some rather severe curtailments in some lines of production through the exercise of priorities. Some of these priorities are affecting the railroads. How far they will continue to do so depends upon the railroads themselves—upon the extent to which railway officers believe that adequate and efficient railway transportation is an essential part of our defense program and are willing to present their cases strongly before the Division of Priorities of the O.P.M. for the procurement of an adequate supply of those essential materials for which there are no practicable substitutes. In the following pages are discussed some aspects of the present problems with respect to equipment and the labor and facilities needed for its repair.

How About Freight Locomotives?

The National Defense Program started out on a comfortable "business-as-usual" basis, with the major emphasis on fitting the emergency portion of our production and distribution into the normal portion with the least possible disturbance. In recent months it has fast been passing through a metamorphosis, from which it is emerging into something much less comfortable. And before we ever again have the privilege of thinking of our affairs in terms of the elusive "normal," they will undoubtedly have become adjusted to a most distressing abandonment of well-worn grooves of action, customary programs of production and long-cherished standards of living.

A year ago, the official attitude with respect to the transportation aspects of our defense emergency was one of complacency—that motive power and rolling stock were adequate in capacity to meet any probable demands which last year would bring. Nothing was said and apparently little thought was then given to the needs of 1941 and beyond. At that time the *Railway Mechanical Engineer* suggested that "when production schedules for armament and munitions get underway, it may be far more difficult to secure deliveries on railway motive power and rolling stock needed to meet succeeding traffic peaks, each higher than its predecessor," and suggested that difficulties of securing deliveries might very well become acute within a few months.

Now, we have a car procurement program looking ahead to 1942 and 1943, which contemplates annual car loadings of 43,680,000 in 1942 and 48,000,000 in 1943. So far, however, little has been said with respect to the motive power needed to meet these increasing traffic volumes. They represent increases of 20 per cent and 32 per cent, respectively, over the total car loadings of 1940.

If train loads are no greater during these years than in 1940, the increase in total freight locomotive miles, required to meet the increase in traffic represented by these estimates, will be of much the same order as the increase in car loadings. Assuming, however, that the average tractive force of the inventory of freight motive power will continue to increase because of the high average tractive force of the locomotives installed and the relatively low tractive force of those retired, it is probable that the average train load will continue to show an upward trend. In that case an increase of freight locomotive miles from 1940 may not be required beyond 12 to 15 per cent in 1942 and about 20 per cent in 1943.

There seems to be no reason to anticipate serious difficulty in meeting the demands of the current year. The gross ton-miles during the fall peak of 1942, however, will probably slightly exceed the gross ton-miles during the fall peak of the year 1929, and the gross ton-miles during the peak of 1943 may be as much as 15 per cent greater than in 1929. With a total locomotive mileage for the latter year less than 10 per cent below that in 1929, it seems evident that the long downward trend in the number and aggregate tractive force of freight locomotives must be reversed and that a net addition of several hundred locomotives and between 10 and 15 per cent of the present aggregate tractive force needs to be acquired during the next two and one-half years.

Transportation is a vital factor in our defense program, as well as in the normal life of the community. While the tonnage of materials required to supply the locomotives needed is not nearly as large as that required for the freight-car program, a greater variety of materials are involved, some of them under priority control. There is much less need for centralized planning in the case of locomotives than in the case of freight cars, and the matter is one for each railroad to work out for itself. It would seem the part of wisdom that any railroad which sees the need for additional freight motive power to meet the estimated demands of 1942 and 1943 should make its plans now. The more advanced knowledge of the needs of the motive power situation the builders and material producers can have, the better the prospect of the railroads for adequate consideration in the distribution of a supply which is not going to meet our needs for defense and for all our normal activities too.

National Defense And Man-Hours

If you break down the government's program for national defense and aid to Britain, it will be found that the billions of expenditures to which we are already committed, will require an almost impossible expenditure of man-hours of skilled labor during the next two years. Where is this labor to come from and still carry on and maintain essential industries? Certainly the railroads will be required to increase their activities, and the problem of maintaining the equipment under this increased tempo promises to be a most serious one.

Railroad shop labor shortages are already beginning to be felt in some few places. It is true that in one or two sections of the country and on a small number of railroads, the shopmen are not now being required to work the maximum number of hours; indeed, some men are still on furlough in a few cases. The shortages roughly about cancel the excess labor in other places, but generally speaking, shop forces at the present time have about all that they can take care of.

What about next summer and fall? Careful planning must be done to meet the situation. Steps are under way in some few places to advance the more experienced helpers or helper apprentices to journeymen and take on additional helpers, in the hope that they can be trained quickly for such work. The railroads have been more or less steadily increasing the number of apprentices, both regular and special, but here again,

the selective service draft has been operating to their disadvantage. Some railroads have asked for deferment for shop workers and, in general, the draft boards seem to have recognized the merit of this request.

Suggestions have been made looking toward the speeding up of the training programs of both the regular and helper apprentices. There has also been a tendency to shift surplus labor to neighboring railroads which were suffering a shortage. In one instance a road found that its equipment was in such excellent shape that it had a surplus of skilled workers, most of which would normally have been used for building new equipment. Lack of material prevented such operations, however, and the men have been loaned temporarily to a neighboring railroad, with the understanding that they can be called back as they are needed.

Conditions vary so greatly in different geographical sections and on different roads, that no common handling or solution can be suggested. It is a case of matching wits with conditions. Obviously, however, it may be wise in some places to institute special training measures to speed up the efficiency of new workers, whether they function as ordinary apprentices, as helpers or as mechanics taken in from the outside, or as men prematurely advanced from their apprenticeship.

A Glance at The Car Situation

The car problem now confronting the railroads resolves itself primarily into two parts, first, how to conserve and get maximum utilization from the present car supply and, second, how to get enough new cars to supplement existing equipment so that both commercial and national defense traffic can be handled without delay during the October peak and subsequently. While more or less extensive troop movements by rail will increase the demand for passenger-carrying capacity, the problem is recognized as pertaining mainly to freight equipment.

It may be said in passing, however, that substantial numbers of new passenger cars are now being turned out by the builders who already find it difficult or impossible to secure certain materials such as aluminum, both high-alloy and low-alloy steels containing nickel, and some galvanized products. The necessity of using substitute steels and other materials wherever possible is apparent. One example which might be cited is the replacement of steel interior finish, partitions and doors with composition materials or plywood, the latter in some instances being metal covered. Plastics may also be used to replace certain metal parts. The combined experience and engineering knowledge of the railroads and railway car builders will prove adequate in solving this particular problem, with one important proviso, namely, that non-nickel steels are made available to car builders in sufficient quantities so that plant production can be maintained.

Railway freight transportation is without doubt one of the most important single items in national defense and hence the vital need for an adequate supply of freight cars of the various types required and in sufficiently good condition to carry shipments quickly and safely to destination. The car building program, recently recommended by the Association of American Railroads, calls for a net increase of 120,000 cars for the anticipated traffic in 1942 and 150,000 for 1943, this equipment being in addition to the 100,000 new cars recommended about a year ago for handling the 1941 traffic. The A. A. R. is authority for the statement that the railroads will have 1,617,000 serviceable cars when the peak load of 1941 occurs in October and, of these, 168,000 will be new and 27,000 will be cars that have been rebuilt since the war broke out. This will provide the railroads with 156,000 more serviceable cars than were available for handling the business of October, 1939.

The productive manufacturing capacity of the car builders' plants has been quoted as roughly 150,000 cars annually and that of the railroads' own shops about 60,000 cars a year. The American Railway Car Institute has informed the A. A. R. that, if the car builders can succeed in increasing man-power and securing the necessary materials, they can produce up to 35,000 cars during the period October 1 to December 1, 1941, instead of 22,500 as had been previously estimated; provided orders are placed immediately for this equipment and in lots of not less than 1,000 cars of each type. (It is estimated that the car builders are booked to capacity for delivery prior to October 1.) Further, with this backlog, and running on an increasing schedule of production, a canvass of the industry indicates, if orders are placed with individual car building plants in lots of not less than 5,000 of each particular type of car required, that an additional 160,000 cars can be produced between January 1 and October 1, 1942. Obviously, this increased production is contingent upon the prompt settlement of orders and details for substantial numbers of cars of standard construction. Another helpful step would be the allocation, insofar as practicable, of individual car types to specific car building plants so as to avoid the inefficiency of split orders and frequent changes in assembly track arrangement with attendant unavoidable slow-up in production.

More than 40,000 cars are now in service in the construction of which low-alloy high-tensile steels have been employed to reduce weight. Those steels which contain nickel are no longer available for car construction. Several such steels, however, contain no nickel and to the extent that they reduce the weight, they reduce the tonnage of steel required to meet the needs of the new car program. There is good reason, therefore, why they should continue to play their part in the present car building program.

In addition to acquiring new cars, what is equally or perhaps even more important at the moment is initiating plans to secure maximum utilization of the

present car ownership. This means full cooperation between the railway operating and mechanical departments, private car companies and shippers, if desired results are to be secured. It is highly important to improve the mechanical condition of freight cars, as reflected by the percentage of bad order cars to revenue cars on line. With some individual roads reporting 10 to 15 per cent bad order cars and a national average of about 4.8 per cent, the railroads have a long ways to go in reducing this figure to about 3 per cent which it ought not to exceed.

Much can be done in reconditioning freight cars to fit them for the next higher class of loading and, in particular, working with shippers to avoid loading high-class cars with materials which prevent their further use in this class of service, at least without considerable unnecessary expense, delay and loss of car mileage. In conserving the car supply for commercial shipments, the railroads are themselves in some instances offenders, by using high-class cars for handling relatively rough company materials such as storehouse supplies, car wheels, rails, etc. This practice is particularly objectionable when the cars are not unloaded promptly but used for storage purposes, as frequently happens. Car cleaning operations, whether directly under the supervision of mechanical officers or not, should be rechecked and keyed up with a view to reducing the time on the cleaning track and hence increasing potential car miles and car days of service.

Shall We Hire Men or Machines?

The man who reads this, if he happens to have any responsibility with respect to the maintenance of equipment, hardly has to be told that events are moving rapidly around the shops and enginehouses these days. Carloadings are mounting and are already at heights that have not been reached since 1930. Out on the line the other day we dropped in on a shop supervisor that hadn't written us a letter for several months just to ask him "Why?". The answer was that these days he hardly had time to sleep for "we are putting everything through the shop that even looks like a locomotive." And there's the story of what is going on at most railroad shops.

Just by way of background here are some statistics that are of interest: In April, 1929, the Class I roads had 30,475 steam freight locomotives on line and 3,601 stored serviceable; in April, 1937, there were 24,315 on line and 1,313 stored serviceable; in April, 1939, there were 25,873 on line and 2,027 stored serviceable; in April, 1940, there were 25,024 on line and 2,131 stored serviceable and, in April 1941 there were 24,388 on line and *1,007* stored serviceable—1,594 fewer locomotives "in the bank" than we had in 1929 and yet we are heading again in the general direction of the 52.8 million carloads that the railroads hauled in that year.

It is true that there are many conditions that are decidedly different than they were in 1929. We are loading both cars and trains heavier and moving them faster. We are running freight locomotives several times the number of miles between shoppings for general repairs than was the case then. There is also the factor of the Diesel-electric freight locomotive—what it can really do when the showdown comes is yet to be seen but the indications are that it will play a very important part in the freight transportation of the immediate future.

All of these things have an important bearing on the problems that are facing the shop and the enginehouse. At this moment locomotive shop operations are about 15 per cent above the average month of 1940 and, by comparison, are about 40 per cent above the average month of 1933. By the same method of calculation the operations at present are within 10 to 12 per cent of the year 1930 and are rising all the time. From the standpoint of railroad earnings this is a situation we have been praying for for almost 10 years, and from the standpoint of the cost of shop operation we are now faced with a situation that many foresighted shop executives have feared for almost 10 years. The truth of the matter is that the time has arrived when railroad shop management is going to have a chance to find out whether or not the "penny-wise and pound-foolish" policy with respect to machine tools and shop equipment is going to be a blessing or a curse. Today our shops are actually faced with the thing we have hoped for and talked about since the days when we were at the bottom of the depression—the prospect of a demand for motive power comparable with pre-depression days. This demand when translated into shop output is about to put a tremendous load on a plant and facilities on which the railroads have spent an average of less than five million dollars a year for modernization during the past five years—five million dollars a year on plant facilities in which the investment is about 350 million dollars. These are the plants which a recent survey has shown to be surpassed only by one other industrial group in the amount of obsolete machine tools and shop equipment within their walls.

It has surprised us immensely to find out within recent months that there are a large number of railroad shop supervisors who have always thought that there was no use in asking for shop equipment because the management wouldn't buy it for them, who now think that there is no use in any railroad asking for new equipment because they couldn't get it under present conditions. The truth is they haven't asked for it, for the machinery now set up in Washington to handle their requests is still unused. If our shops fail to measure up to the job that is immediately ahead of them whose fault will it be?

The problem now is to get the men or the facilities to do the job at hand. It is up to shop managements to decide which can be secured in the shortest possible time—trained men or modern machines.

Mechanical Division Program

THE nineteenth annual meeting of the Mechanical Division, Association of American Railroads, will be held at St. Louis, Mo., on Thursday and Friday, June 19 and 20, in the main ballroom of the Jefferson Hotel. On Thursday, the meeting will convene at 9 a. m. and adjourn at 5 p. m. The Friday session will also convene at 9 a. m. and will continue until the program is completed.

Reports of 12 standing committees will be presented and discussed. In the convention calendar it is suggested that the committees limit themselves in the presentation of their reports to a brief summary of their principal features. The convention calendar also states that the Committee on Subjects will be appointed by the chairman at the opening session on Thursday, June 19, to receive questions for discussion from the members. This committee will determine whether such questions are ones suitable for discussion and, if so, will report them to the Division at the proper time for discussion by the members. Members are requested not to start discussion on subjects at the session of the meeting which have not first been referred to the Committee on Subjects.

The details of the program are as follows:

THURSDAY, JUNE 19

Address by L. W. Baldwin, president, Missouri Pacific

Address by Chairman W. H. Flynn, general superintendent motive power and rolling stock, New York Central

Action on Minutes of annual meeting of 1940

Appointment of Committee on Subjects, Resolutions, etc.

Unfinished Business

New Business

Report of General Committee

Report of Nominating Committee

Discussion of Reports on:

- Lubrication of Cars and Locomotives
- Brakes and Brake Equipment
- Couplers and Draft Gears
- Joint Committee on Utilization of Locomotives and Conservation of Fuel
- Locomotive Construction

FRIDAY, JUNE 20

Discussion of Reports on:

- Arbitration
- Prices for Labor and Materials
- Tank Cars
- Loading Rules
- Wheels
- Specification for Materials
- Car Construction
- Committee on Resolutions

Modernization of

Erie 4-6-2 Locomotives

Eleven locomotives being rebuilt with cast-steel beds—Multiple guides of the suspension type have no connection to back cylinder heads

To increase the availability and reduce the cost of maintenance of its Class K-5-A heavy passenger locomotives, the Erie is modernizing the eleven locomotives in this class by improvements consisting mainly of changes in construction. All of the locomotives have been equipped with large tenders having a capacity of 24 tons of coal and 16,000 gal. of water to facilitate operation on their assigned runs in main-line passenger service between Marion, Ohio, and Jersey City, N. J., a distance of 730 miles. Eight of the locomotives have Franklin boosters and ultimately all of them will have this equipment which produces a tractive force of 12,075 lb. The basic design of the original locomotives, as built in 1923 by the Baldwin Locomotive Works, has been retained in the rebuilt locomotives, the dimensions and proportions of which are shown in the table.

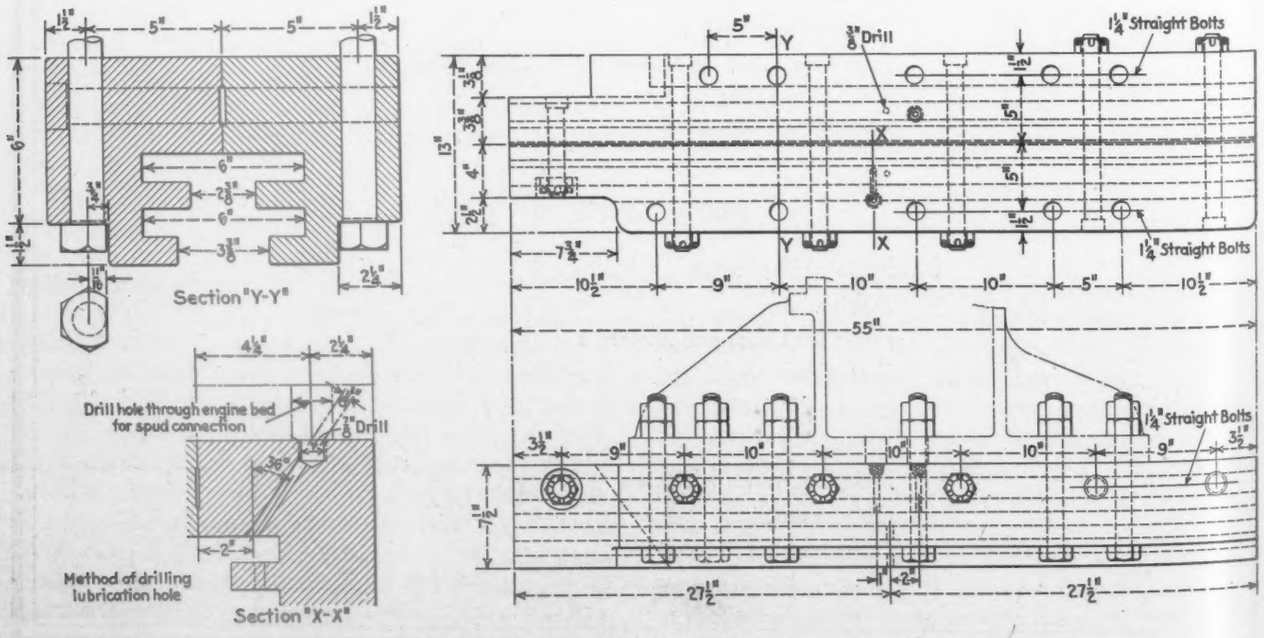
The principal construction feature is the application of one-piece engine beds with the cylinders, air-pump brackets and guide-yoke crossties cast integral which eliminates the bolting of these parts and reduces to a minimum the trouble experienced from loose bolts in the conventional built-up frames of the original locomotives. The breaking of pedestal-cap toes on the old frames has been taken care of by the strengthening of this part on the frame beds.

The design of the suspension-type multiple guides is of particular interest because it eliminates any connection between the guides and the back cylinder heads. This arrangement overcomes the trouble caused by unequal expansion when the guides were bolted to the cylinder heads. The new guides are bolted only to the guide yoke. The details of the application are shown in the drawing.

Other improvements include the use of Boxpok driving wheels and the application of Baker valve gears with Multirol needle bearings. Four of the six locomotives completed to date are equipped with Timken roller bearings on the engine-truck, driving and trailer-truck axles.

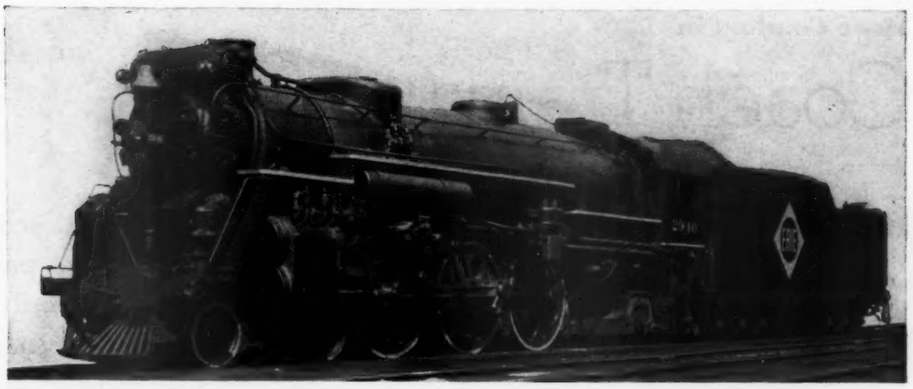
General Dimensions, Weights and Proportions of the Erie Modernized 4-6-2 Locomotives

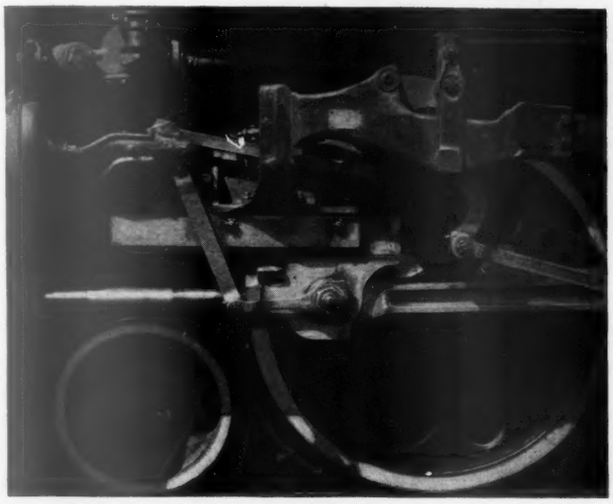
Railroad	Erie
Builder	Baldwin Loco. Wks.
Type of locomotive	4-6-2
Road class	K-5-A
Date built	1923
Service	Passenger
Dimensions:	
Height to top of stack, ft.-in.	14-11⅞
Height to center of boiler, ft.-in.	10-3
Width overall, in.	123⅜
Weights in working order, lb.:	
On drivers	205,300
On front truck	60,400
On trailing truck	66,200
Total engine	331,900
Tender	314,200
Wheel bases, ft.-in.:	
Driving	14-0
Engine, total	37-1
Engine and tender, total	80-3¾
Wheel diameter outside tires, in.:	
Driving	79



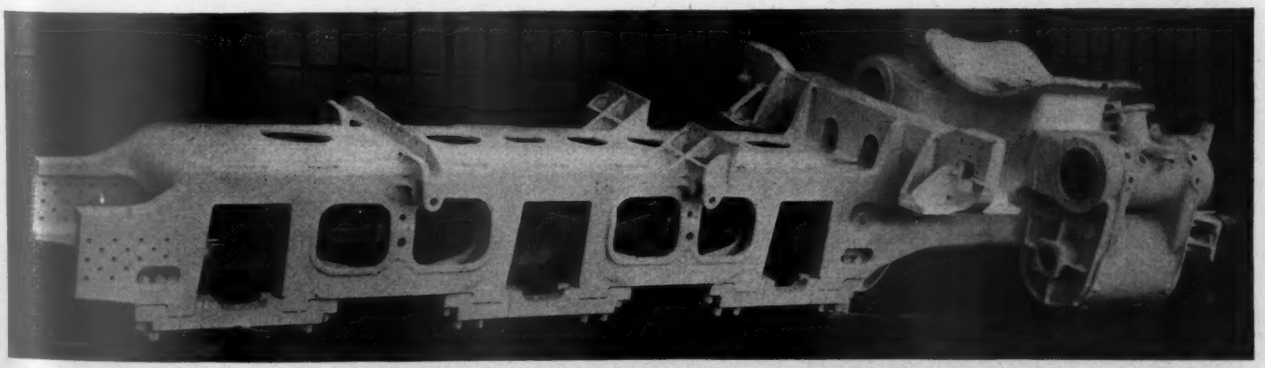
Details of the suspension-type guide showing bolting arrangement to the guide-yoke crosstie

Right: The modernized Erie 4-6-2 locomotives have the air pumps located in front of the smokebox. Below: The suspension-type guide has no connection to the back cylinder head





Front truck	36
Trailing truck	43
Engine:	
Cylinder, number, diameter and stroke, in.	2-27 x 28
Valve gear, type	Baker
Valves, piston type, size, in.	14
Maximum travel, in.	7
Steam lap, in.	1¼
Exhaust clearance, in.	¼
Lead, in.	¼
Boiler:	
Type	Conical
Steam pressure, lb. per sq. in.	210
Diameter, first ring, outside, in.	78
Diameter, largest outside, in.	90
Firebox length, in.	120⅛
Firebox width, in.	84¼
Arch tubes, number and diameter, in.	2-3
Thermic syphons, number	2
Tubes, number and diameter, in	190-2¼
Flues, number and diameter, in.	45-5½
Length over tube sheets, ft.-in.	19-0
Fuel	Bituminous
Grate area, sq. ft.	70.8
Heating surfaces, sq. ft.:	
Firebox and comb. chamber	230
Arch tubes	14
Thermic syphons	71
Firebox, total	315
Tubes and flues	3,403
Evaporative, total	3,718
Superheating	1,315
Comb. evap. and superheat	5,033
Tender:	
Type	Rectangular
Water capacity, gal.	16,500
Fuel capacity, tons	24
Trucks	Six-wheel
Journals, diameter and length, in.	6 x 11
General data, estimated:	
Rated tractive force, engine, 85 per cent, lb.	46,100
Rated tractive force, booster, lb.	12,075
Total rated tractive force. lb.	58,175
Weight proportions:	
Weight on drivers ÷ weight engine, per cent	61.86
Weight on drivers ÷ tractive force	4.45
Weight of engine ÷ evap. heat. surface	89.26
Weight of engine ÷ comb. heat. surface	65.94
Boiler proportions:	
Firebox heat, surface per cent comb. heat. surface	6.26
Tube-flue heat. surface, per cent comb. heat. surface	67.62
Superheat surface, per cent comb. heat. surface	26.22
Firebox heat. surface ÷ grate area	4.45
Tube-flue heat. surface ÷ grate area	48.06
Superheat surface ÷ grate area	18.57
Comb. heat. surface ÷ grate area	71.09
Evaporative heat. surface ÷ grate area	52.51
Tractive force ÷ grate area	651.13
Tractive force ÷ evap. heat. surface	12.4
Tractive force ÷ comb. heat. surface	9.18
Tractive force x diameter drivers ÷ comb. heat. surface	725.22



The Commonwealth bed casting has the cylinders, guide-yoke crossties and air-pump brackets cast integral

More Comfort in

Coach-Train Cars

Bulkhead seats eliminated and space per passenger increased in Budd-built equipment delivered during the winter for Florida coach-train service

DURING the past winter new passenger-train cars delivered to the Atlantic Coast Line and the Seaboard Air Line by the Edward G. Budd Manufacturing Company increased the capacity of the de luxe coach trains on each of these railroads to three trains of 14 cars each. In the general arrangement of combination cars, dining cars, and club lounges the new equipment followed the same general arrangement as was employed in the earlier orders of cars for these services. One exception is that the cars with observation sections were built with rectangular ends and vestibule connections instead of curved streamline ends. This permits the use of these cars in the middle of a train as well as at the end of a train.

The new coaches in both of these orders, however, include refinements in the floor plan and additional toilet facilities, as compared with the earlier cars developed for de luxe overnight coach service by this builder. The earlier coaches were laid out for a seating capacity of 60 persons in the main passenger compartment with a men's room at one end of the car and a women's room at the other. The end seats of these cars were either fixed against the bulkheads and non-reversible, or were directly opposite the end of the corridors alongside the lounge rooms. The water cooler was placed against one of the bulkheads at the end of the aisle, where it was immediately alongside the seat at the bulkhead. In this way conditions were unfavorable for the comfort and privacy of passengers seated at the ends of the car.

In the new cars the floor plan has been arranged so that by the reduction of four persons in the seating capacity all seats are reversible and a uniform degree of privacy is afforded by each seat in the car. This has been accomplished by placing partitions between the end seats and the corridors alongside the rest rooms at the ends of the car. The water cooler has been moved from its former location to the corner of the corridor adjacent to the new partition.

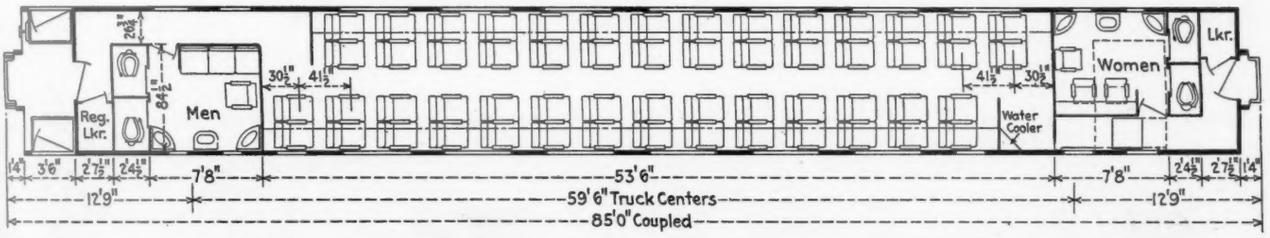
In the earlier cars a single toilet opened from the rest room at each end of the car. In the new floor plan are included two toilets at each end of the car. These are placed alongside each other and occupy a space 2 ft. 4½ in. deep alongside the end of the rest rooms. The use of sliding doors made this arrangement practicable.

These cars, of which eight are in service on the Atlantic Coast Line and seven on the Seaboard Air Line, are of characteristic Budd construction. The center sills, side frames, floor sections, and roofs are of stainless steel, fabricated by the Shotweld process. Each car has a single vestibule entrance, and all are air conditioned.

The six cars with square-end observation sections include three tavern-observation cars for the Atlantic Coast Line and three observation-chair cars for the Seaboard Air Line. The tavern-observation are similar in arrangement to those built previously for this service. However, besides the modification in rear-end contour, the floor plan of the observation-chair cars has been changed to include a buffet and a stewardess room. The buffet occupies a 5-ft. 8-in. section directly ahead of the observation room while the stewardess room is located in a 5-ft. 5½-in. compartment between the buffet and the chair section. These additional facilities, together with the elimination of bulk-head seats, has reduced the capacity of the chair section from 48 to 30 persons as compared to the cars of this type on the earlier orders. The seating capacity of the square-end observation section is 23, the same as the capacity of the curved-end observation sections. The general structural features of these cars are similar to those employed in the coaches.

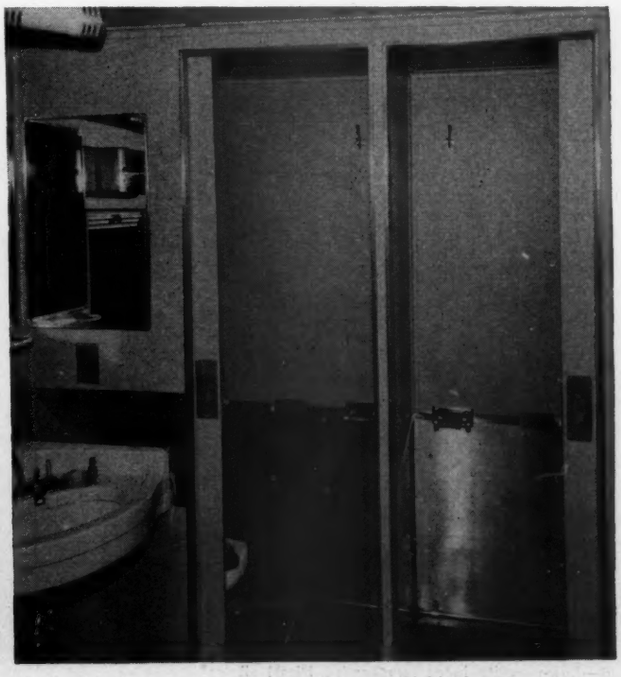
Interior of the square-end observation section

The square-end observation car for the Atlantic Coast Line's Champion. Similar cars were built for the Seaboard Air Line's Silver Meteor



The floor plan of new Budd-built coaches which have been in service in the New York-Florida de luxe coach trains during the past season

A partition adds privacy to the end seats opposite the corridor and protects passengers from drafts when the end doors are opened



Coaches installed in New York-Florida service during the past winter have two toilets at each end of the car

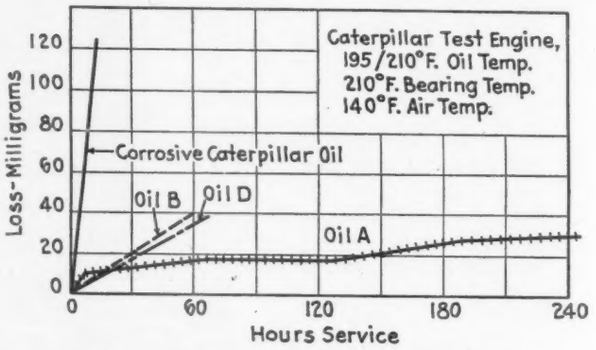
Heavy-Duty Detergent Lubricant

The Standard Oil Company of New Jersey has announced a new type of engine lubricant, Essolube HD, developed to overcome piston varnishing, ring sticking and other major lubrication troubles of heavy-duty, high-speed Diesel and gasoline engines. It has a viscosity index of approximately 100, nearly twice that previously available in special detergent oils, meeting the full range of known heavy-duty engine requirements. This new lubricant has, in addition to its resistance to oxidation and high temperature, the ability to wash out sludge deposits, protect bearings from corrosion and to prevent substantial deposits of varnish on pistons, valve stems, rings and other engine parts. It also has a valuable rust preventive action.

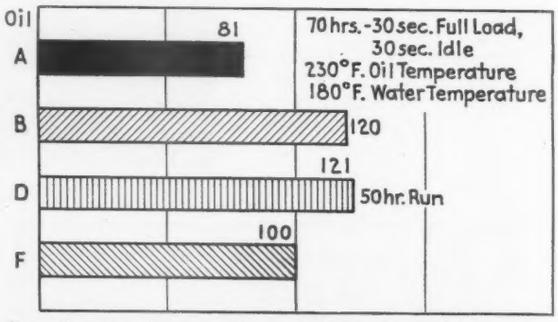
Detergent type oils in themselves are not new. Heretofore, however, oils with sufficiently high detergent or washing properties to eliminate ring sticking, varnishing and sludge deposits in the full range of present heavy-duty engines have had, for chemical reasons, to utilize base stocks of relatively low viscosity index. While such oils markedly improved engine cleanliness, many engines have required, in addition, high resistance of the base oil itself to oxidation and bearing corrosion. A major problem for petroleum chemists, has been to develop an oil which, while possessing these detergent properties, had the high stability usually characterized by lubricants of high viscosity index.

Viscosity index, while primarily a measure of an oil's ability to resist change in viscosity with changes in temperature, is also a useful measure of the stability and protection furnished in service. Laboratory evidence shows that the stability of an oil against oxidation and heat increases, in general, with the viscosity index of the oil.

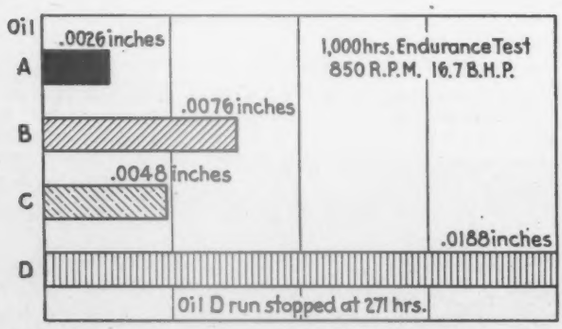
Essolube HD has been tested in the laboratory and



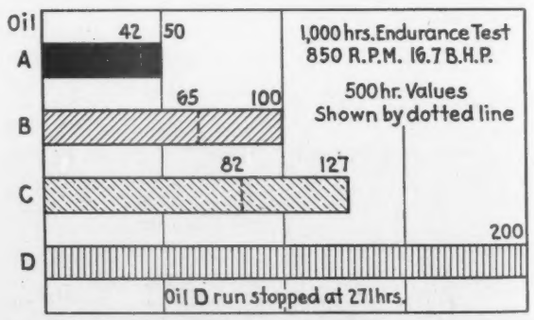
Weight loss of copper-lead bearings—Corrosion tests



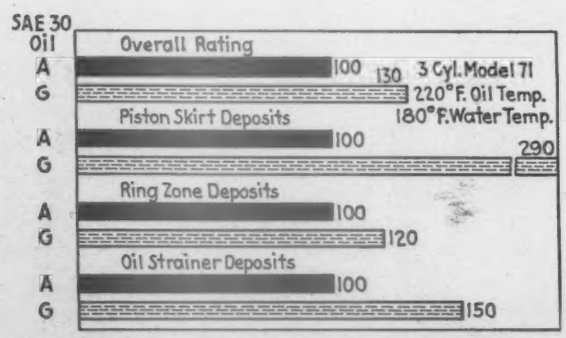
Over-all engine deposits—General Motors three-cylinder engine



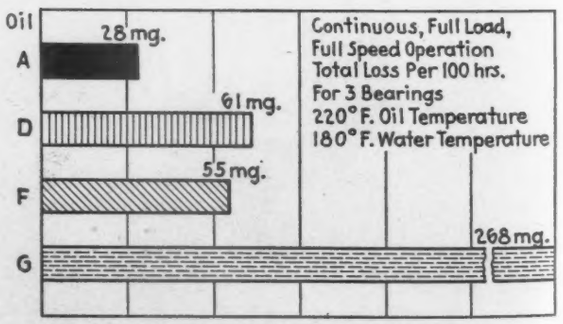
Maximum cylinder liner wear—Caterpillar single-cylinder engine



Over-all engine deposits—Caterpillar single-cylinder engine



Five-hundred-hour, full-load, full-speed test—General Motors Diesel



Weight loss of copper-lead bearings—General Motors three-cylinder engine

DESCRIPTION OF OILS TESTED

A—Essolube HD, a high-viscosity index oil

B—Low-viscosity index compounded Diesel oil

C—Low-viscosity index compounded Diesel oil, limited for use to engines with babbitt bearings

D—Straight mineral oil of medium viscosity index used in moderate duty Diesel service

E—Straight mineral high-viscosity index oil used as the base in oil "A"

F—Straight mineral oil of high viscosity index

G—Compounded oil in low-viscosity index base stock using addition agents radically different from oil "A"

on the road in actual service operations, the summary of some of the laboratory test results being shown in the charts. It has passed the General Motors Diesel engine test, which calls for a 500-hr. run in a General Motors high-speed Diesel engine under full load and at full speed without oil change. It has also been formally approved by the Caterpillar Tractor Company for use in its Diesel engines, passing the 1,000-hr. endurance runs in a Caterpillar engine under both laboratory and field conditions. Essolube HD is the first high viscosity index lubricant to obtain Caterpillar approval and the first high viscosity lubricant to have passed both the Caterpillar and General Motors Diesel engine test requirements.

Sectional Top Protects Gondola-Car Lading

In an effort to make the use of gondola cars more universal, permitting their use for a wider range of products, a new section top has been devised for gondola cars which protects the contents of the car from weather and tampering. The sectional top, light in weight and easily installed and disassembled, was developed by J. M. Hilbish and J. H. McCahan, Pittsburgh, Pa.

The top is fabricated from No. 20 gage sheet steel and reinforced with $\frac{3}{16}$-in. by 1-in. flats and 1-in. by 1-in. by $\frac{3}{16}$-in. angles. One section weighs about 70 lb. and is either 24 or 34 in. wide with length adjusters to fit varying car widths. The entire top for a 46-ft. car weighs about 1,200 lb. A top is usually formed of 16 sections that interlock with each other by means of a standing seam, interlined with sponge rubber that forms a waterproof seal. Waterproof paper is laid between the sections and the car sides to prevent seepage.

The complete top can be installed by two men in less than two hours, while the removal of the top is a matter of only a few minutes. Each section is fitted with a board cat-walk, forming a car-length walk when all covers are in place, thus affording a means for traversing the car top in safety. Each section will support the weight of three men on the cat-walk. Heavy coil-spring fasteners, permanently attached to each section, hook over the bulb angles at the side of the car and hold the section rigidly in place. Special lever tools carry out the fastening process easily and quickly, providing a fastening which cannot be tampered with in transit.

The system, patented, has been approved by the Interstate Commerce Commission and the Bureau of Safety.

The sectional top applied to a gondola car

* * *

This 4,000 hp. Diesel-electric locomotive, designed and built by the American Locomotive and General Electric Companies, left Schenectady, N. Y., early in May for delivery to the Atchison, Topeka & Santa Fe. It is destined for regular service on the Super Chief

Suggestions for Mechanical Associations

M. B. M. A. Correction

The circular letter sent out on April 7, 1941 by Albert F. Stiglmeier, secretary-treasurer of the Master Boiler Makers' Association, to the association members, listed John A. Doarnberger as chairman of the committee on Resolutions and William N. Moore as chairman of the committee on Memorials. This listing should have been just the reverse as Mr. Moore was selected to serve as chairman of the Resolutions Committee and Mr. Doarnberger as chairman of the Memorials Committee.

Coal Equivalents Widely Vary

Under existing instructions, the monthly consumption of the various kinds of fuel and power are reported to the Interstate Commerce Commission by each railroad "reduced to their equivalent in net tons of coal, using such ratios of equivalence in heating values as the experience of the respondent indicates are applicable to local conditions." These quantities, stated as net tons of coal, are combined in the statistical statements of performance for the various districts and regions and for the Class I railways as a whole, and inevitably there is some tendency toward the drawing of comparisons between the performances of individual roads, even between those that use different kinds of fuel and power. The wide fluctuation in "coal equivalents" used by the various railroads is notorious and leads, in some instances, to gross misinterpretations of fuel performance figures. The Railway Fuel and Traveling Engineers' Association has attempted to clarify this situation in the past and again this year its Committee on Fuel Records and Statistics will submit at the annual Fall meeting proposals for uniform formulae which might be adopted by all the railroads for determining the coal equivalent of each kind of fuel and power. While it is not anticipated that agreement can be obtained to the use or rigid formulae for general application, it is hoped to develop formulae which will take into account any reasonable local variations and at the same time narrow materially the present extreme variation in values of "coal equivalents."

The C. D. O. A. Is Complimented

According to the last figures available, Class I line-haul railways are spending practically $233,000,000 a year for passenger and freight car repairs, and in order for this outlay of money to bring the greatest possible returns through improved car equipment conditions, it is obvious that car foremen and supervisors of all ranks must be alert to discover and adopt improved practices in the application of car repair materials and in the handling of car maintenance forces. Since some of the most aggressive and progressive car supervisors in the country are members of the Car Department Officers' Association, it is obvious that the annual meetings of this Association present an excellent opportunity for all those in attendance to pick up new ideas regarding car maintenance, as well as design and use. The increasing recognition of the potential usefulness of the Car Department Officers' Association is shown by letters recently received from 40 mechanical department heads who expressed thanks for individual copies of the 1940 Proceedings which were sent to them and complimented the association by offering to permit local car supervisors to serve on various committees where they can do the most effective work. Typical is the comment of one chief mechanical officer who says "While I have not had an opportunity to go through the Proceedings to any great extent, I know from past performance of this organization that there is a lot of good data contained therein. I approve of the selection of the officers on the . . . and will co-operate with you to the fullest extent in making your organization a success." The national scope of the Association's activities is indicated by the fact that these letters came to the secretary's headquarters at Chicago from mechanical officers at such distant and divergent points as Montreal, Can., Derby, Me., Savannah, Ga., Dallas, Tex., Los Angeles, Cal., Sacramento, Cal., St. Paul and Minneapolis, Minn.

Present Papers in Full

I have noted with much interest the page entitled "Suggestions for Mechanical Associations," in the late issues of the *Railway Mechanical Engineer*. Many of the articles published have mentioned the forwarding of advance copies of the committee reports to the membership, and the presentation of only abstracts of the reports at the meeting.

The writer is quite confident that best results are obtained by the reading of papers in full. This has been demonstrated at the meetings of the Master Boiler Makers' Association, where it has been the procedure for the committee members, when their paper is being read and discussed, to be alert and participate in the discussion of their committee report. If the papers and discussions published in the 1940 proceedings of the Master Boiler Makers' Association are scrutinized, one will note that it is not necessary to forward advance copies of the committee papers to the membership, but rather, it is essential that those in attendance be kept interested during the reading of the paper and its discussion.

Further, to bring about interesting and beneficial meetings, no selfish attitude can be shown towards individuals or other associations. An endeavor must be made for closer cooperation between associations in joining in the presentation and discussion of papers as has been demonstrated by the Water Service Committee of the American Railway Engineering Association ,the International Acetylene Association, university personnel, locomotive builders, other industries and the M. B. M. A.

Also, the proceedings that contain the committee and special papers and their discussions should be made available without charge to railroad officers, mechanical associations, university and public libraries in the United States, Canada and foreign countries as is the practice of the Master Boiler Makers' Association.

With such cooperation, the minor railway mechanical associations will continue to function and be of benefit to the railroads and the association membership.

ALBERT F. STIGLMEIER, *Sec.-treas., Master Boiler Makers' Association*

The title of a mailing piece prepared recently by Locomotive Maintenance Officers' Association—"Have You Got Troubles," will probably strike a sympathetic chord with most of the railroad mechanical department men who get one. The circular tells about the association's background, who runs it and what are its objectives

Centralized Repairs for

Air Pumps and Reverse Gears

By G. H. Raner*

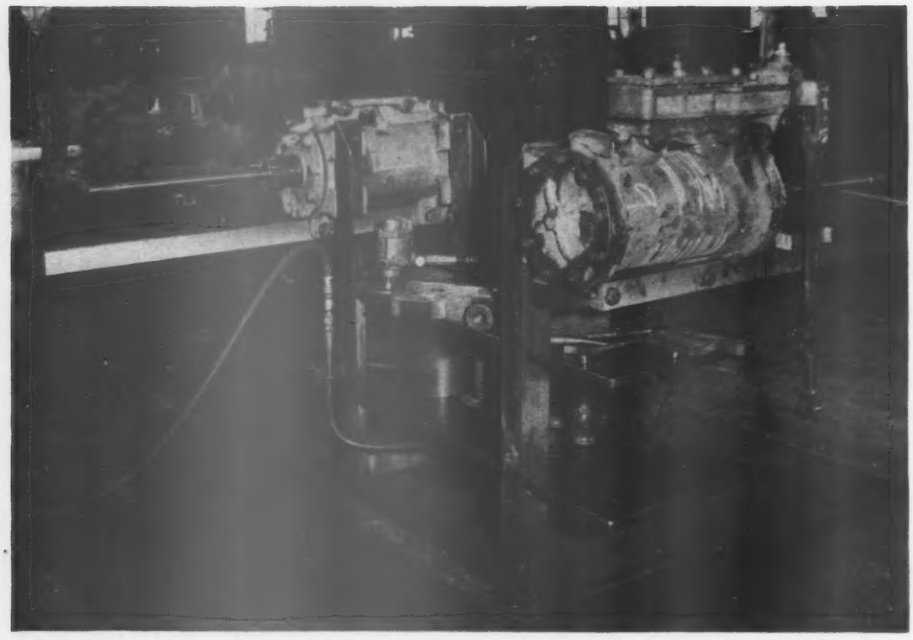
A SHOP department especially arranged and equipped for making heavy repairs to locomotive air compressors and power reverse gears is now being operated with unusually satisfactory results at the Paducah, Ky., locomotive shops of the Illinois Central. All air compressors and power reverse gears from locomotives for the entire system are repaired at this central shop, the general storehouse at Paducah affording a convenient, efficient and prompt means of handling the equipment to and from the various shops on the system.

Compressors are sent in for repairs principally mounted on skids and are handled from the storehouse car unloading ramps to the repair shop by means of a lift truck. Such a truck is shown delivering compressors to the lye vat. This vat consists of four compartments each 10 ft. long by 6 ft. wide by 6 ft. deep, arranged for the particular purpose of cleaning compressors. The capacity in three of the compartments is six No. 5 New York Duplex compressors and three Westinghouse 9½-in. compressors; the fourth compartment of the vat is used for rinsing the compressors with hot water after they have been cleaned. The compressors are raised and placed in the vat with an overhead craneway and an electric hoist. They are not just placed in the lye vat as is ordinarily done in the case of other materials, but are held upright on metal racks attached to the sides of the vat, the steam end of each compressor protruding just above the cleaning solution. No bolting or clamping is necessary.

Steam connections are then made to both intake and exhaust, the exhaust pipe being arranged so that the exhaust may be carried up overhead. The compressors are then operated by steam while submerged, pumping the hot vat solution through the air end of the pump, which cleans the inside at the same time the outside is undergoing cleaning. A multi-jet discharge pipe is connected to the air end of the pump and formed to fit partly around the center casting, through which the solution is discharged to clean that portion of the pump thoroughly and in the least time. After the compressors remain a sufficient length of time for proper cleaning, they are removed and placed in the rinse compartment of the vat, coupled to a steam line and rinsed with water.

* Assistant shop engineer, Illinois Central.

Above: Compressor assembly bench equipped with five revolving tables to facilitate repair work—Right: Moving air compressors on a skid and lift truck to the lye vat



Convenient repair rack on which power reverse gears are overhauled

After this cleaning process, the compressors are placed back on skids and moved into the air room by means of a lift truck for the second operation, namely, that of stripping, inspecting and necessary calipering of the cylinder diameters. When cylinders are worn to the point of requiring rebushing, they are bored out on a 54-in. vertical turret lathe; the bushings are applied by means of an hydraulic press at approximately six tons pressure for 8-in. bushings and 10 tons for 12-in. bushings. In either case, whether or not new bushings are necessary, the cylinders are all smoothly ground on one of the Micro internal grinders, such as is shown in one of the illustrations. Compressors are then moved to the assembly bench where new pistons and rings are fitted or the old pistons turned on a lathe, located adjacent to the Micro grinder, so that the repair work may be carried on in a progressive way.

One of the many interesting features of this shop is the assembly bench arrangement, which consists of a long table or work bench, on which is mounted five revolving circular tables, made of cast iron in two parts, each 38 in. in diameter and 1¾ in. thick. Between the two there is a ball race 30 in. in diameter which contains one hundred ⅞-in. balls. In the center is a 2-in. pin which holds the top and bottom plates central. The bottom plate is fastened to the table with four ¾-in. bolts, the heads of which fit into counterbored holes. The top plate has suitable holes tapped out for cap screws, spaced so as to hold either of the two types of compressors while being assembled. Just underneath the bottom plate at the outer edge and within easy reach of the repairman, there is a spring-operated plunger that fits in holes suitably located in bottom of the top plate so that the operator may reverse the compressor by revolving the table at any angle to work on either end. This, of course, eliminates the necessity of the operator walking around the compressor or table.

Under each compressor, shelves are available to hold

Micro internal grinder on which compressor cylinders are accurately ground

the tools the repairmen need, a convenient arrangement which saves many steps. Directly back, there is a vice for each repairman to use when necessary and also bench space and drawer space for any additional tools or equipment that may be used in assembling the compressors. With such an arrangement, lost motion and extra moves are eliminated. This set-up makes it possible for a mechanic to assemble an entire pump without moving much more than within a radius of two feet.

After the compressors are assembled, they are moved to a permanent test rack where they are thoroughly tested and operated for several hours under pressure, for testing of valves and packing rings and general operation of the compressors.

Another photograph shows the test rack on which two compressors are undergoing test. Three air reservoirs may be seen located just above the pumps and piping which is merely an air storage. Compressors are bolted to properly spaced and suitable brackets on the rack. They are handled to and from the test rack by an overhead traveling crane on which is mounted a one-ton capacity electric hoist.

After the compressors are tested, ordinary pipe plugs are screwed into the intake and outlet ends, the heads are blown out with air to eliminate moisture and just enough oil run in to prevent rusting until the compressors are returned to service again. Compressors are sprayed on the outside with a cheap grade of light paint to eliminate rust; they are loaded on flat top skids and moved directly to the storehouse for distribution. No compressors are shipped with connections or studs in place as they are all removed to eliminate damage in handling. It will be observed that the lugs of the finished compressors shown on the truck are protected against breakage when handling by means of $\frac{5}{8}$-in. by 4-in. steel plates extending between each horizontal pair of lugs and firmly bolted to them.

Only locomotive air pump compressors that are worn to the point of requiring general overhauling are forwarded to Paducah; in other words, only those compressors that have been in service on a locomotive from one Class 2 or 3 shopping to another, unless, of course, because of accident or some unusual incident. In order to control this feature, a bronze badge plate is attached to the center piece of each compressor after it is re-

Test rack used in checking air compressors after being repaired

Moving repaired compressors to the storeroom—The lugs are protected with metal strips

paired on which the following information appears: Serial number; repaired at Paducah; date applied; place; engine number; date removed and place.

The serial number and date repaired are steel stamped on the badge plate at the compressor repair shop. The date applied, place and engine number are steel stamped by the shop where the compressor is applied to the locomotive; also date removed and place, this being the final date removed. A record of mileage on each compressor is maintained in the repair shop as the compressors are returned. Old dates are filed off and new applied at class repairs.

Power Reverse Gear Repairs

Power reverse gears of all types in service on the Illinois Central are given general repairs in this shop, also at the time of general shopping of the locomotive. The procedure is that they are first cleaned by submerging in a lye vat, the exteriors being cleaned only and rinsed off. They are then moved into the shop and placed on racks, one of which is clearly illustrated. Each rack accommodates two power reverse gears and there are five double racks in the department. These racks are rigidly constructed and of a sufficient height so that the gears can be readily worked on by repairmen. It will be noted that the racks have two shelves for necessary tools and packing. Work benches and vices are conveniently available, with suitably located air connections at each rack for necessary testing.

After being placed on the racks, a thorough check is made by means of calipers and gages and, if a cylinder is found to be scored or otherwise marred requiring redressing, it is then bored and ground on a Micro grinder. A $\frac{5}{16}$-in. limit of oversize is allowed on both the 9-in. and 7-in. power reverse gear cylinders. Only about one out of each five cylinders required boring and grinding; none are rebushed. Adjacent to the rack is a small drill press and shaper and such other small tools as are necessary for efficient handling of repairs to power reverse gears. There is also a lathe conveniently located to true up pistons and rods.

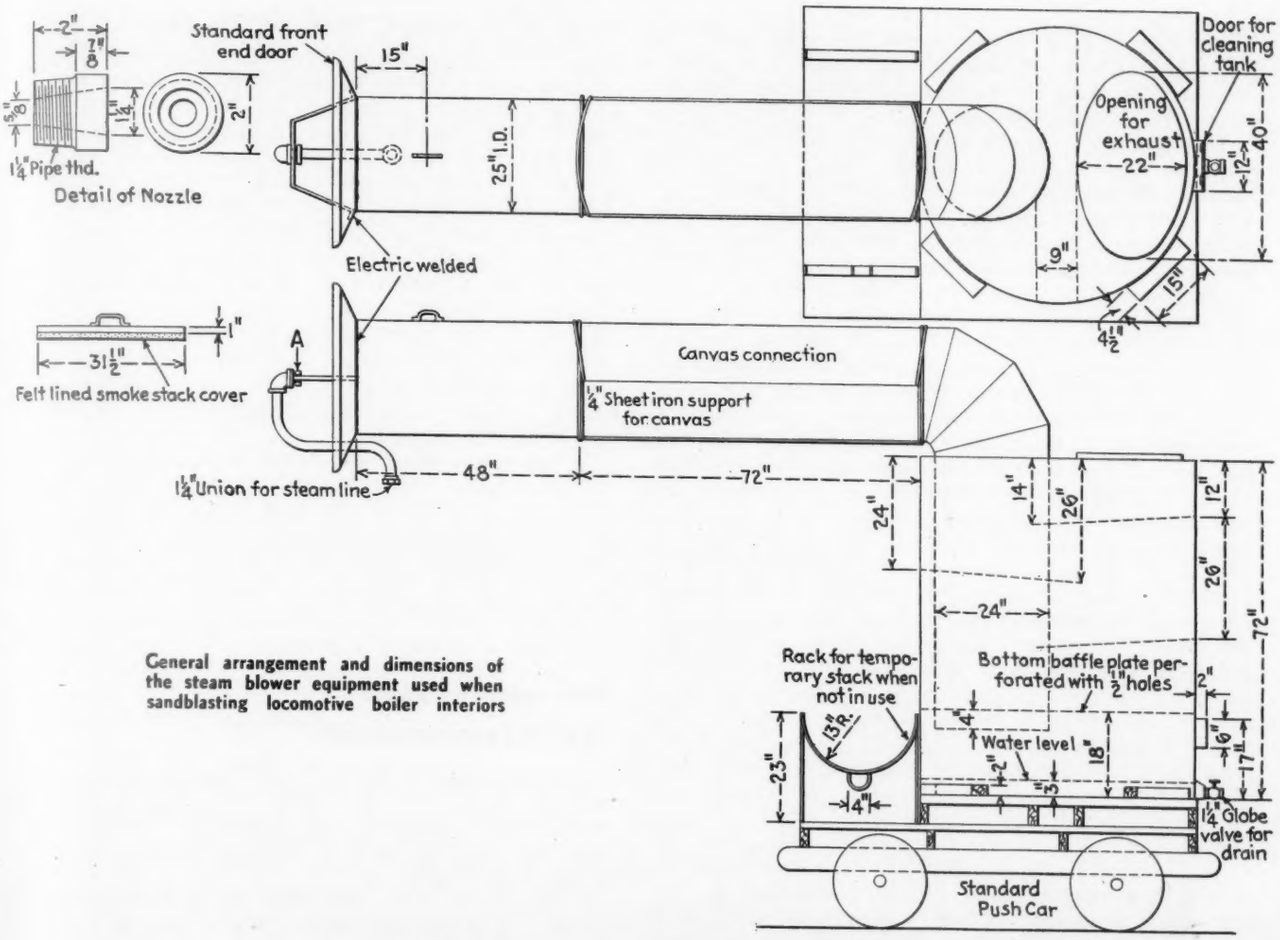
While the maintenance work of both air pumps and power reverse gears is located in the same repair room, each is independent of the other. Machines and equipment are provided and so arranged so that one will not interfere with the other. When repairs are completed to power reverse gears, they are thoroughly tested, properly tagged and a rust preventive applied. In addition to the two kinds of equipment repaired in this shop, as already described, all locomotive gages are repaired, including quadruplex air gages, steam gages, back-pressure gages and air gages. Such parts as pneumatic bell ringers and fire-door openers are also repaired here.

This repair shop now maintains the equipment formerly repaired in 14 different shops. An output of locomotive air compressors, power reverse gears and other miscellaneous equipment mentioned is set up in advance and calculated on the number of locomotives which are expected to be given general repairs within a 12-month period. In this way of handling, the monthly output for that period remains constant and results in more efficient and economical procedure.

Sandblasting Boiler Interiors

WHENEVER, for any reason, it may be convenient or desirable to sandblast the interiors of locomotive boilers without removing the locomotives from the erecting shop, the equipment shown in the illustrations may be used to do a thorough job without objectionable sand and dust particles filling the air and being deposited on shop machinery, locomotive parts, and tools. This equipment, developed at the Atchison, Topeka & Santa Fe shops, San Bernardino, Cal., makes it feasible to use the sandblast method of cleaning boiler interiors instead of removing scale with an air gun, a laborious time-consuming operation and one which is prohibited in the case of nickel-steel boilers on the Santa Fe. The sanding method is particularly advantageous in cleaning

Truck-mounted sandblast tank and equipment including auxiliary sand supply wagon which carries enough sand for one boiler interior



General arrangement and dimensions of the steam blower equipment used when sandblasting locomotive boiler interiors

Steam-blower-type exhaust equipment used at the San Bernardino shops of the Santa Fe when sandblasting boiler interiors in the erecting shop

boiler stays and, in fact, it leaves the entire boiler interior in excellent condition for the inspector to make a thorough, accurate check whenever tubes and flues are removed for class repairs.

This method of sandblasting boiler interiors depends upon an efficient exhaust system which includes, primarily, putting a felt-lined cover over the smoke stack and locating a steam jet at the center line of a 25-in. exhaust pipe extending from the front end door through a canvas sleeve connection to a sheet-metal tank which is thoroughly baffled so as to let the exhaust air escape from the top, but retain all of the dust particles in the tank. With the steam jet in operation, therefore, a strong draft is created in the boiler, drawing air from the firebox out through the front-end door, and sanding operations using conventional equipment may be carried on in the barrel of the boiler without hazard to the sandblast operator or to shop men working around the locomotive.

Details of the exhaust equipment are illustrated. The part attached to the locomotive consists of a false boiler front door of standard size, cut out at the center to receive one end of a 25-in. by 48-in. cylinder made of ¼-in. tank steel and securely welded to an air-tight joint with the door. A 1¼-in. steel pipe section carries the steam line through the front end door where it is bent and connected to an ell and nozzle directed along the center line of the 24-in. pipe and supported 12 in. back of the door by means of a bracket iron. This nozzle is tapered from ⅝ in. to 1¼ in. diameter in 2 in. of length in the direction of steam flow and consequently fills the exhaust cylinder and creates an efficient draft with an initial pressure of about 80 lb. In addition the steam has the effect of partially killing the dust.

The sand receiving end of the exhaust equipment consists of a sheet-metal tank, 4½ ft. in diameter by 6 ft. high, made of galvanized iron, mounted on a four-wheel push car and having a 24-in. elbow at the top connected to a straight vertical section of pipe which extends down to within 14 in. of the bottom of the tank. The tank is thoroughly baffled with a total of four baffle plates, the lower one, perforated with ½-in. holes, being located 18 in. above the bottom of the tank which is covered with about 3 in. of water. A check of the measurements will show that the 24-in. vertical pipe extends 4 in. through the bottom baffle plate and discharges the air, condensed steam and dust directly onto the surface of the water. A large elliptical opening in the top of the tank allows easy escape of the exhaust air. A 6-in. by 12-in. hinged door for hand cleaning is located in the side of the tank 17 in. above the bottom and a 1¼-in. globe drain valve is installed as near the bottom as possible for flushing purposes.

Connection between the exhaust cylinder on the front-end door and the 24-in. galvanized ell is made by means of a canvas sleeve 6 ft. long with draw strings at either end to assure practically air-tight joints. Support for the bottom of the canvas sleeve is afforded by a sheet-metal strip curved to fit the radius of the cylinder and the ell and held firmly against them by light wire or cable connections. A rack on the front of the push car makes a convenient place to carry the exhaust cylinder and front end door when not in use.

Reference to the view showing the firebox end of the locomotive shows the sandblasting equipment used in cleaning the boiler interiors. This consists of the usual sand and air tank mounted on two large wheels for portability and equipped with the necessary fill-up cap, operating valves and 2-in. hose connections to the sanding nozzles which are used to give direction to the air and sand stream in the boiler. A good cutting sand is required and air pressure is supplied from the shop line at about 100 lb. per sq. in. The auxiliary sand-supply wagon, shown at the right in the illustration, carries enough sand for cleaning one entire locomotive interior.

The removal of scale from the inside of a locomotive boiler using this equipment is relatively simple. The sandblast operator, equipped with suitable clothing, gloves and a helmet which takes air from outside the boiler, begins at the bottom of the front course and gradually cleans scale and rust off the sides and top of the course, then backing up to the next course and repeating the operation until the entire boiler interior is cleaned. The average time required is about eight hours, dependent first upon whether the boiler has ever been scaled before and second, how long it has been empty prior to sandblasting. The operation of cleaning is relatively easy when the boiler has just been cooled down and the flues removed.

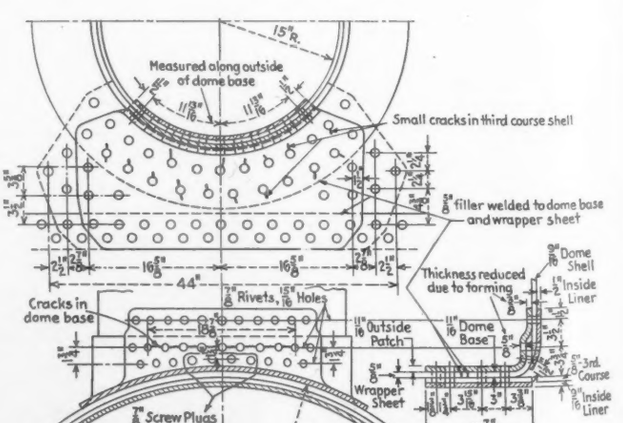
After sandblasting, the heavy sand and scale on the interior of the boiler are scooped out through the flue sheet and disposed of, the sand being lost since it cannot be separated from the scale. Damp, heavy dust in the truck-mounted sheet-metal tank is removed through the clean-out door and dumped, the residue being washed out through the drain valve.

Steam-Dome Reinforcement*

The boiler patch shown on the drawing proved to be quite a problem in fabrication. As may be seen, the defects to be reinforced were composed of several small cracks in the boiler shell at the rivet holes in the steam-dome base. There was also an 18⅞-in. crack through the rivet holes in the dome base at the shell connection.

The patch was first rolled to the outside radius of the dome base on the boiler. Then it was flanged to a 15 9/16-in. radius about an axis at a 90-deg. angle to the original roll. Finally, it was offset over the top of the dome base so as to fit the dome shell. The greatest problem involved was that of holding to a minimum the reduction in the thickness of the material during the flanging process. The top of the flange was reduced from 1 1/16 in. to ⅜ in., thus requiring an inside liner to restore the original strength at the 18⅞-in. cracks in the dome base.

* An entry in the prize competition on boiler patches announced in the March, 1939, issue. The names of the prize winners were published in the August, 1939, issue.



Boiler patch application at steam-dome base

Questions and Answers On Welding Practices

(The material in this department is for the assistance of those who are interested in, or wish help on problems relating to welding practices as applied to locomotive and car maintenance. The department is open to any person who cares to submit problems for solution. All communications should bear the name and address of the writer, whose identity will not be disclosed when request is made to that effect.)

Wear Plates And Broken Frames

Q.—In recent months we have had an epidemic of broken locomotive frames. The odd part of this is that the majority of these frames have broken where the spring hangers chafe the frame. These worn spots have been covered with a wearing plate electrically welded in place. Can you tell what is causing this?

A.—This condition seems to exist wherever wear plates are arc-welded to the frame. The bead of weld placed alongside the plate when welding the plate to the frame seems to cause a tiny fracture which in time causes a broken frame. Many roads have discontinued this practice and are filling these worn spots solid with either the electric or the acetylene process. Wear-resisting bronze is an excellent material to repair these worn spots with.

Eliminating Blow Holes in Brazing

Q.—We have considerable trouble brazing pistons. The deposited bronze is sometimes so full of blow holes as to render it useless. Can this be corrected?

A.—This trouble occurs principally on solid or cored-type piston heads and not on the bull-ring type. The welding operator will often notice as he applies the wear-resisting bronze that hundreds of tiny jets of flame blow through the molten puddle. This is caused by the release of the gas formed from the oil in the pores of the cast iron. This oil, heated by the flame, seems to have a tendency to release itself at the time the puddle is directly over it and makes an unsightly looking welding job. To correct this, heat the area to be brazed to a dull red and allow it to cool. When cool, grind the surface bright and the piston is ready to braze.

Curing A Torch Of Bad Habits

Q.—When a cutting torch develops the habit of snapping, cracking and popping out the only remedy seems to be to apply a new tip, which is expensive. Could you suggest a more economical cure?

A.—The snapping and popping out that you mention is caused by pre-ignition; that is, the gas lights behind the tip instead of at the end where it should. This is usually caused by a loose or ill-fitting cutting nozzle. This is especially true in torches having a flat seat.

When a cutting tip has this defect, test it to see that it is tight in the torch; if it is and it still acts up, remove the tip from the torch and inspect the seat. If the seat is cut or damaged, hold it squarely on a mill file and rub it along the file, turning the tip around before each stroke. This should dress off the tip seat so that it will fit squarely against the seat in the torch. If possible, the seat should be faced in a lathe. When this is done the small circle in the center should be left .001 in. higher than the rest of the seat.

Building Up Worn Stoker Screws

Q.—We have a number of stoker screws of the Duplex elevator type to reclaim. On many of these the edges are worn so thin that it is difficult to weld without burning through. What method is recommended in this case?

A.—Place the worn screws in a lathe and turn the flight to 1¼ in. under the desired finished size. Cut some ⅝-in. square bar stock into 6-ft. lengths. Place the screw on two horses of a convenient height and tack one of the 6-ft. pieces to the bottom of the flight. Heat the square steel with the torch and form it to the contour of the flight, tacking it securely every 10 in. An occasional slight twist with a wrench will keep the bar flat with the machined surface. When the ⅝-in. bar is affixed the entire length, the screw is held in an upright position and the space between the hub and the bar is welded level full. The flight will not burn through because the thin edge has been removed.

Acetylene Welds Over Electric Welds

Q.—Is it possible to make a successful acetylene weld over a previously made electric weld?

A.—It is practically impossible to make an acetylene weld over a bare-rod electric weld. The character of a coated-rod weld is similar to an acetylene weld and if the flux inclusions are not too numerous, a fair torch weld can be made over one of the coated-rod variety. The best method is to remove all arc-weld material before attempting to reweld, even if this makes it necessary to form a small new section from bar or plate stock.

Repairing Injector Bodies By Welding

Q.—When welding worn or cracked injector bodies, what can be done to keep the body from cracking? Invariably this happens in building up an injector body.

A.—Injector bodies like any similar thin casting must be preheated before welding to make a good job. If the body is cracked, chip the crack out with a sharp chisel, taking every precaution to avoid breaking out large pieces of the body. When the inspirator is worn from contact with the jacket, cab or pipes, clean the areas to be brazed free from all dirt and scale. With a large tip in the blow pipe heat the injector slowly and evenly until it is sizzling (about 600 to 700 deg.) quickly change to a small tip and complete the bronze welding. The metal in the average injector body lends itself readily to welding. As soon as the welding is completed change again to the large tip and reheat the entire casting. If the tubes were not removed from the injector, the welder should warn the mechanic repairing it that the tubes may be loosened from the welding heat and he should check them before assembling.

Welding Torch Tip For Driving-Box Work

Q.—What size welding tip should be used for brazing driving boxes?

A.—It is difficult to state the size welding head, or tip, needed because each manufacturer has a different method of numbering. However, a welding head with an orifice of about $\frac{5}{32}$ in. using between 100 and 125 cu. ft. of acetylene per hr. is effective. Some operators prefer a larger flame than others but too large a flame tends to burn the applied metal and render it less efficient.

Locomotive Boiler Questions and Answers

By George M. Davie

(This department is for the help of those who desire assistance on locomotive boiler problems. Inquiries should bear the name and address of the writer. Anonymous communications will not be considered. The identity of the writer, however, will not be disclosed unless special permission is given to do so. Our readers in the boiler shop are invited to submit their problems for solution.)

Imperfections in Boiler Plate

Q.—What allowance for imperfections should be permitted in accepting boiler shell plates?—M. E. F.

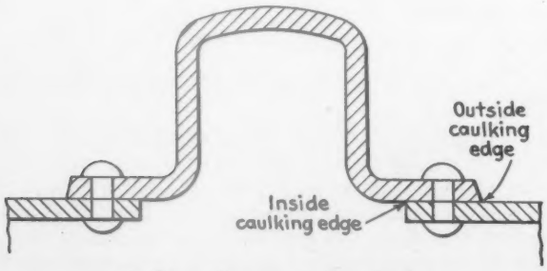
A.—All boiler shell plates should conform strictly to the specifications to which they were ordered. Check analysis for each plate should be made of the chemical composition of each melt of steel used in making the plates. A tension and bend test should be made from each plate as rolled. The furnished material should be free from injurious defects and have a workmanlike finish.

The A. S. M. E. Boiler Construction Code provides as follows in connection with imperfections in boiler plates: All plates should be examined for surface defects, such as scale, depressions and laminations. Plates may be accepted having depressions not over four inches in length or a depth not exceeding 15 per cent of the thickness of the plate, if upon careful measurement of the depressions it is found that the reduced thickness does not leave the plate weaker than where machined for rivet holes or tube holes. Plates that are found laminated shall be rejected.

Determining Load on Auxiliary Header

Q.—We are applying an auxiliary header to several of our locomotives. The header is of flange steel and is riveted to the shell of the boiler. In determining the required number of rivets for securing the header to the shell, is the load on the rivets taken as the boiler pressure times the area of the rivet circle?—F. E. R.

A.—In determining the required number of rivets for securing a header to the shell, the stress on the rivets shall be obtained by multiplying the area bounded by the outside caulking multiplied by the maximum allowable working pressure, where the caulking is on the outside edge of the header. Where the caulking is on the inside edge of the boiler shell (and with no outside caulking) the stress shall be equal to the area bounded by the inside caulking multiplied by the maximum allowable working pressure. The caulking edges referred to above are shown in the illustration.



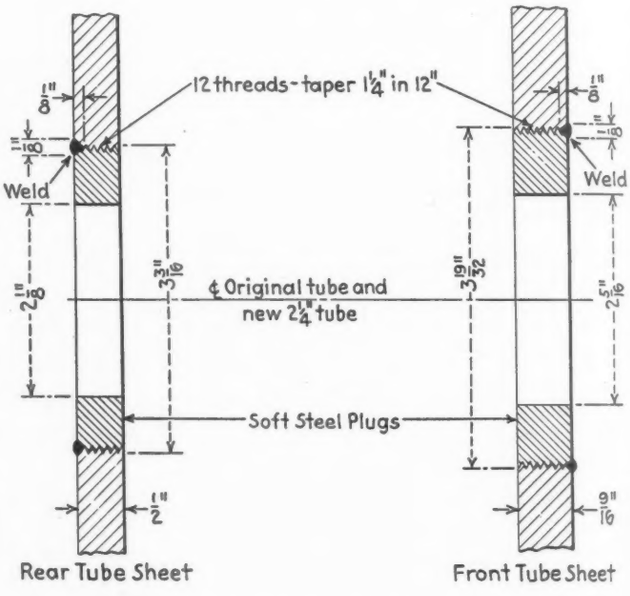
Caulking edges on auxiliary header

Preparing Tube Sheets for Application of Smaller Tubes

Q.—In applying a firebrick arch to several Mikado locomotives, it is necessary to reduce the size of two of the lowest tubes from 3½-in. to 2¼-in. outside diameter tubes. Would you recommend a method of altering the front and rear tube sheets to make this change?—S. B.

A.—The illustration shows one method of altering the front and rear tube sheets of a locomotive boiler when replacing 3½-in. with 2¼-in. outside diameter tubes in the same locations.

The alteration consists of tapping out the original holes in the tube sheets, using a tap with 12 threads per



Method of applying steel plugs to tube sheets for reducing size of holes to take smaller tubes

inch tapered 1¼ in. in 12 in., and applying soft steel plugs screwed in and welded all around. The holes should be plugged preferably from the water side. Plugs are then drilled for application of the 2¼-in. tubes as illustrated.

Distance from Back Head to First Row of Staybolts

Q.—We have several Mikado type engines operating at a pressure of 225 lb. per sq. in. We intend to replace the fireboxes in these engines using welding seams in place of riveted seams. The question has arisen as to the distance from the knuckle of the backhead to the first row of staybolts adjacent to the knuckle, both for the crown and sides of the backhead. Should the same staybolt layout be used with the welded firebox as with the riveted firebox?—C. H. D.

A.—The general practice where templates are not available is to lay out the new firebox sheets using the old sheets as templates, thus assuring proper alinement of the staybolts in the new firebox with old holes in the wrapper sheet and backhead.

When butt-welding the firebox door sheet to the crown and sides, it is preferable to have the welded seam between two rows of staybolts as illustrated in Fig. 2. With this type of construction, the sheet is supported on both sides of the weld by the staybolts. This would also be true for the seam between the firebox tube sheet and the crown and sides. The distance from the knuckle of the door sheet to the first row of staybolts adjacent

to the knuckle on both the door sheet and the crown and sides would remain the same for both riveted and welded construction.

The A. S. M. E. formula for determining the pitch

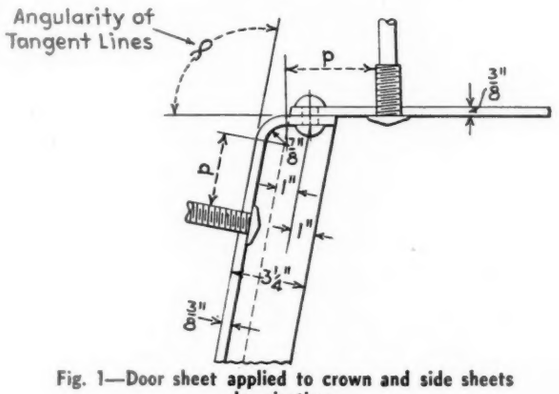


Fig. 1—Door sheet applied to crown and side sheets by riveting

from the staybolt next to the corner to the point of tangency of the corner curve, see Figs. 1 and 2, is as follows:

$$p = \frac{90\sqrt{C\,\frac{T^2}{P}}}{\text{Angularity of tangent lines}}$$

where

p = Maximum pitch, in. (see Figs. 1 and 2).
T = Thickness of plate in sixteenths of an inch.
P = Maximum allowable working pressure, lb. per sq. in.
C = 125 for stays screwed through plates not over 7/16 in. in thickness with ends riveted over.

Assume the angularity of the tangent lines to be 115 deg. and the thickness of plates 3/8 in. The maximum pitch as shown in Figs. 1 and 2 for a pressure of 225 lb. per sq. in. would be

$$p = \frac{90\sqrt{125 \times \frac{(6)^2}{225}}}{115}$$

$$p = \frac{90\sqrt{125 \times .16}}{115}$$

$$p = \frac{90 \times 4.47}{115} = 3.5 \text{ in.}$$

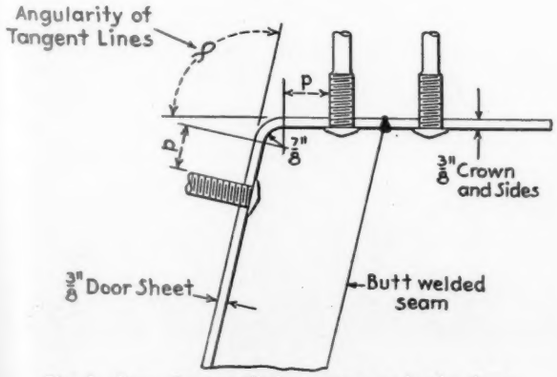


Fig. 2—Door sheet applied to crown and side sheets by welding

Cemented-Carbide Tool Grinder

The illustration shows a grinder made by Thomas Prosser & Son, New York, for the reconditioning of all types of single-point tools including those of cemented carbide, stellite or high-speed steel. It is equipped with two quick-acting tables with graduated indexes which permit setting the tool to any desired angle. The tables can be almost instantly adjusted to the required angle due to the construction and location of the pivot point in the same plane as the surface of the wheel.

The motor is reversible so that either right- or left-hand tools can be ground with a wheel rotating toward the cutting edge. The grinder is equipped with a brake for quickly stopping the machine and saving time when changing the direction of rotation. The brake is fitted with a replaceable brake shoe. The motor has a speed

The Prosser cemented-carbide tool grinder is equipped for the accurate grinding of single-point tools

of 3,450 r. p. m. for maximum grinding efficiency with both the 7-in. silicon-carbide wheels and the 6-in. diamond wheels.

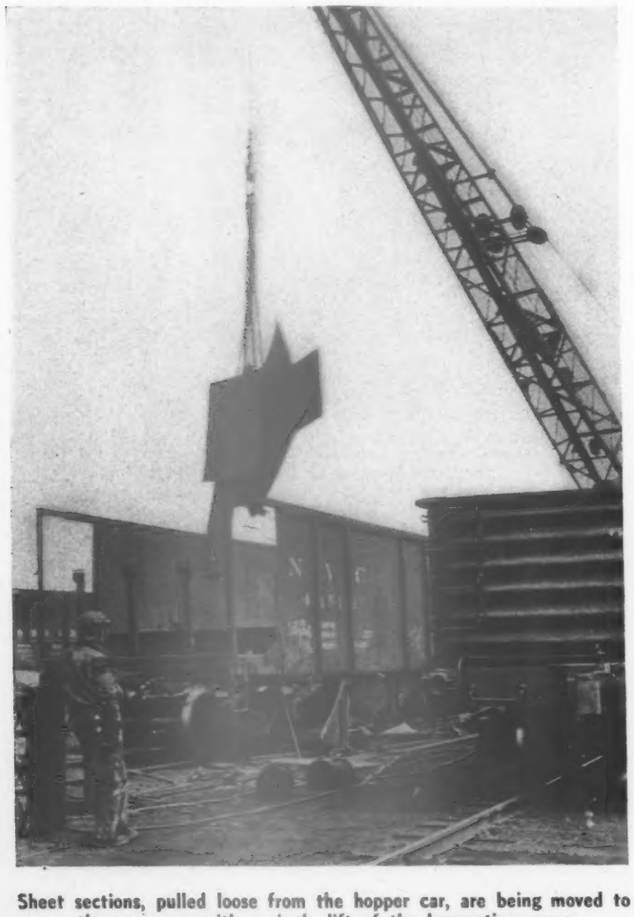
The grinder was designed especially for the use of either diamond or silicon-carbide cup wheels. The combination of a silicon-carbide wheel for roughing and a diamond wheel for finishing is often used, although more and more diamond wheels are being used for roughing. When a diamond wheel is ordered with a machine, a special lubricating device is furnished for the proper lubricating and cooling of the wheel surface while grinding. The silicon-carbide cup wheels are mounted on steel backing plates and their location on the shaft is adjustable to compensate for wheel wear. An adjustable light is installed for the proper illumination for the work on either table.

Beech Grove

Freight-Car Shop Methods

At the Beech Grove, Ind., shops of the New York Central, the progressive or straight-line method of repairing freight cars is used with some modifications to adapt it to local shop conditions. The present program of work includes the making of heavy repairs to a series of 50-ton hopper cars and to a series of 40-ton wood-sheathed steel-underframe box cars. An output of eight hopper cars and eight box cars a day is now being secured with a force of approximately 350 men in the freight car department. While there is nothing strikingly new about the straight-line method used in repairing them, a number of shop tools, methods and devices seem worthy of special comment.

In stripping the hopper cars, for example, at the first position on tracks outside the steel car shop, the corroded, sides, ends, hopper sheets, floor sheets, etc., are stripped from the car and moved by a locomotive crane into the adjacent scrap car with a single operation which is believed to be unique. This method saves a great amount of hand labor and time, as well as contributing to safety and a generally clean and well-picked-up condition along the repair tracks, even at the stripping position.



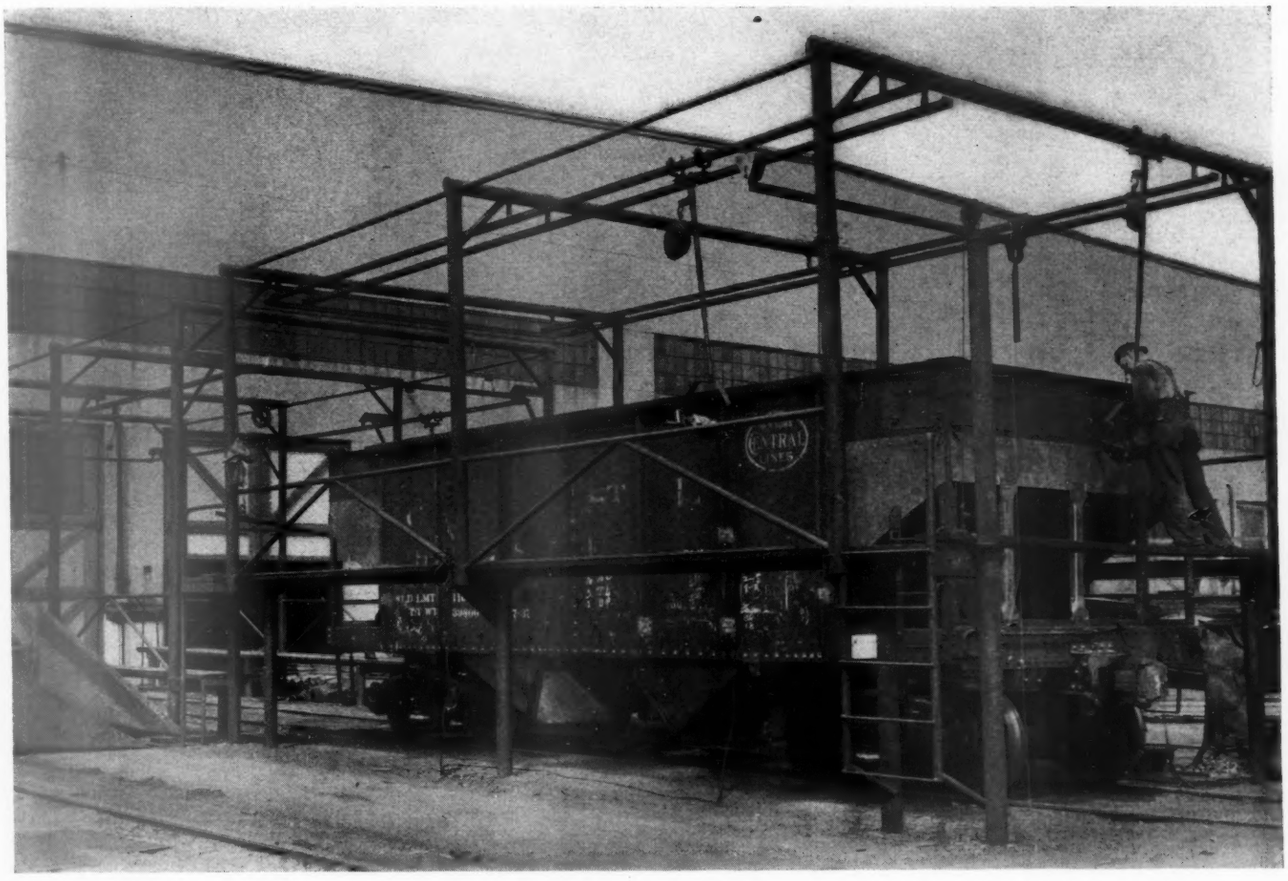
Sheet sections, pulled loose from the hopper car, are being moved to the scrap car with a single lift of the locomotive crane

The first operation in stripping steel hopper cars consists of burning out the rivets which hold the corroded sheets to be replaced. In this work, experienced operators using oxy-acetylene torches with special rivet-cutting tips burn through the centers of the rivet heads and melt out the rivets without any damage to surrounding sheets. Three or four rivets are left in each sheet with just the heads burned off so as to hold the sheet temporarily in place, but permit it to be jerked loose with an easy pull from the locomotive crane. In a few inaccessible places where there is not room to manipulate the cutting-torch head, rivets may have to be backed out. A triangular hole is cut near the center of each sheet for attachment of the crane hook.

When everything is ready, a locomotive crane and scrap car are moved to a track alongside the stripping position. The large crane hook is equipped with an auxiliary six-way chain, having a small hook at the end of each of the 6-ft. chain sections. The crane cable is lowered until each of the six-way chain hooks can be inserted in one of the V-slots in a hopper-car sheet section, as shown in one of the illustrations. Operation of the crane then, in one upward movement, pulls loose six sheet sections which continue their upward movement until clear of the car sides when they can be readily swung over and dropped in the scrap car. Four lifts are usually adequate to strip a hopper-car floor system complete which includes the hopper sheets, floor sheets, longitudinal hoods, cross hoods, end sheets, etc.

Typical of the labor-saving methods and equipment used in actual car repair and assembly operations at Beech Grove shops is that shown in one of the illustrations where a hopper car is located under a special steel pipe framework and all reaming is done with high-cycle electric tools. In this case, each tool is supported in a counterbalanced frame which gives complete flexibility

Six-way chain with hooks engaging individual sheet sections ready for removal of the sheets with a single lift



Special equipment used at reaming position to permit easy and safe one-man operation of electric or air-operated tools

of movement of the motor-driven reamer, both longitudinally, vertically and inwards and at the same time supports the reamer handles so that the operator is in no danger of losing his balance and being knocked off the scaffold in case the reamer sticks and the handles have a tendency to turn unexpectedly, with full power on.

The framework at the reaming position consists of 5-in. and 2-in. scrap superheater flues which are unsuitable for further use in locomotive boilers but are still amply strong for structural purposes. Their framework is 36 ft. long by 18 ft. wide by 32 ft. high and it will be noted that two reaming positions are provided. The main vertical supporting posts are mounted in substantial concrete footings outside the repair track and carry a scaffold or platform 6 ft. high on either side of the car, supported as shown in the illustration and equipped with a 2-in. guard rail. A welded steel ladder gives easy access to each platform.

The upper part of the 5-in. pipe frame serves as a support for an overhead track made of 2½-in. by 3-in. T-iron and arranged so that two balancers are readily traversed around the track for reaming from the outside of the car and two additional balancers for inside reaming. Each balancer consists of a telescoping arrangement which gives a 6-ft. vertical movement and counterbalances the weight of the motor by means of a spring suspension at the top and a wire cable. At the point of application of the electric motor, a bracket made of 2-in. bar iron is attached to the balancer and supports the electric motor by means of the two handles, adding to full safety for one-man operation.

End scaffold boards for reaming the car ends are supported by two cables with counterweights inside the pipes so the boards may be readily raised or lowered by one man. These boards are equipped with guide plates which keep them in position and enable them to be easily elevated whenever it is necessary to move a car in or out of the reaming position. Electric connections are provided at each center post so that the operator does not have to get down from the scaffold to plug in his electric motor. The view of the reaming position included with this article shows an operator on the end scaffold board reaming an end sheet which has been partially renewed.

Inside the steel car shop, a flame-cutting machine, shown in another illustration, is used to good advantage in the cutting of stacks of steel sheets to specified patterns and shapes. Referring to the illustration, the template or pattern which is used in guiding an extension of the gas-cutting head of the machine is bolted to the table at the left. The steel sheets to be cut are stacked in groups of twelve ¼-in. sheets, for example, which are supported on the metal framework in the right foreground of the picture. The stack edges are firmly held together by C-clamps and each stack is itself held rigidly in place on the work table by air-operated lever clamps, one of which is marked *L* and shown prominently in the illustration. These lever clamps are adjustable in position along the operating bar *B*, to suit the length or size of the material being cut. They are made of 1-in. by 4-in. bar iron, arranged with a wrench end at the right to fit around the 2-in. by 4-in. bar *B*, which can be revolved slightly by lever connection from an air cylinder beneath the work table. The bottom equalizing lever is shown at *E*.

Air-operated lever-type clamps used in holding stacked car-sheet sections on work table while being flame-cut to desired shapes

When the stack of sheets has been properly located on the work table, air is admitted to the cylinder under the table which forces equalizing bar *E* to move to the right. This causes bar *B* to revolve slightly and brings a downward pressure on the center of the stack of steel sheets by means of the clamp levers which hold the sheets firmly during the cutting operation. Subsequent release of the pressure enables the holding levers to be disconnected and the stacked sheets moved to the next position in the fabrication line.

This flame-cutting machine is used in the quantity-production of many steel-car parts, such as hopper sheets, longitudinal hood sheets, cross hoods, floor sheets, etc., as compared with shearing and coping individual sheets, there is considerable saving of time and manual labor in handling. Moreover, material is saved since the scrap pieces cut out with a torch are undamaged and may be used for the production of other car parts of small size, whereas machine coping usually cuts interior material beyond any possibility of further use.

Still another machine which contributes greatly to the efficient operation of the Beech Grove steel shops is the duplicating machine, shown in one of the illustrations. This machine is designed to punch and cope steel sheets ranging in thickness from $\frac{3}{16}$ in. to $\frac{3}{8}$ in., and with holes up to 6 in. round or 6 in. square. A master sheet is simply clamped to the left end of a work

Duplicating machine which punches and copes car steel sections accurately, rapidly and with no re-handling

Paint transferring pump and mixing tanks which assist greatly in efficient paint handling at the Beech Grove Shops

table which carries the sheet to be formed clamped to a gage line on the right end of the table. The operator stands on a traveling platform opposite the master sheet and utilizes one hand wheel for longitudinal and one for transverse movement of the table. Adjusting the master sheet until a finder pin in the head registers with a center positioning hole in the pattern, operation of a foot-pedal switch causes the punch to operate and make a hole of the desired size or shape and at the proper location in the work sheet.

All layout work is thus avoided (except for one master sheet) and maximum accuracy and duplication of desired shapes is secured. Sheets may be handled 6 ft. wide by 12 ft. long. Experience indicates that best results are secured when one sheet is punched or coped at a time. The maximum production with this machine is 36 strokes per min., and it is featured by a central lubricating system, roller-bearing electric control and solenoid operation of the individual punches. The use of the machine saves not only layout time and rehandling time, but assures uniform accuracy in the punched and coped sheets which avoids difficulty in subsequent fabrication.

One feature of the work at Beech Grove freight car-shops which is not particularly new but has shown excellent results is the equipment used in storing and mixing paints in a clean, warm paint house, with access to the paint supplies available from the outside, as shown in the illustration. All of the painting operations in connection with freight-car work involve the use of paint-spray equipment, and the paint-spray tanks may be filled from the outside without the necessity of going into the paint house.

Referring to the interior view of the paint house, there are eight paint tanks of 100-gal. capacity each, mounted on a concrete base about 12 in. above the floor. A double overhead rail supports four air motors in roller-equipped steel frames which can be moved to desired positions over any four tanks simultaneously and used to drive double-blade agitators in the tanks, thus keeping the paints well mixed. The drive shaft from each motor is easily attached by means of a coupling to the end of the agitator shaft which extends up to and through the steel tank cover. The motor speed is usually adjusted to about 40 r. p. m.

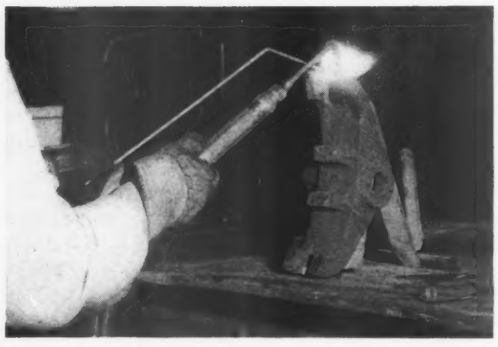
At the right of the illustration, a 9½-in. air pump is shown mounted in a steel frame and used to transfer paint from drums as received from the manufacturer into the mixing tanks. The drum, shown in the illustration, has a capacity of 52 gal., and can be emptied, using this equipment, in about 10 min., without any manual handling. A 2-in. pipe connection is simply made to the air-cylinder intake, the discharge side being connected to the pipe line supplying the series of paint tanks, with shut-off valves available so that the paint may be forced into whichever tank is desired. The pump is then operated, using shop air pressure and no difficulty is experienced in handling any kind of paint except heavy cement which cannot be put through the pump.

(*Continued on page 241*)

Individual distribution spigots extending through the painthouse wall give easy access to well-mixed paint supplies

Welding Kinks For the Small Car Shop

By Harvey Arthurs



The welder's corner in the shop is decorated with a variety of the implements of his trade. Some idea of the many things that are used by the welder are shown in the storage cabinet in the large photograph at the left.—The two small views above show a very simple device for holding the ordinary brake head while the worn spots are built up by welding. This welding jig is designed so that it will not slide around on the bench while being used

SOME of the methods used and the devices developed for car welding work in a repair shop on a small eastern road are shown in the accompanying photographs and described here. The photograph of the car shop welder's cupboard will give the reader a general idea of the variety of jigs that clutter up the welder's habitat.

A typical welder's job is that of holding a passenger-car truck brake head. Any one who has attempted to build up a brake head will realize the utility of this device. There is no surface on the brake head that is square and, if it is leaned up against something, it is bound to slide off the bench onto the floor. This simple jig is so arranged that it will hold the brake head horizontal for building up the sides of the bosses. It also holds the head upright for building up the ends of the lugs. This jig is a piece of ¼-in. by 2-in. steel bent to an angle of sufficient height to support the brake head. A heavy piece of steel is tacked to one leg of the angle for weight so that the jig will not slide around on the bench. A small foot is bent on one side to hold the bottom of the head from kicking out and a piece of ¼-in. by 1-in. iron is welded to the other side. This will slip through the brake pin hole and hold the brake head in a convenient flat position. Wear-resisting bronze is used to build up the worn places on the head and it seems to wear fully as long as the original metal.

On some of the older type passenger and milk cars the cast-iron open-type pedestal is still in use. When these pedestals are removed they are completely rebuilt with bronze. The bronze is applied carefully and checked frequently for size, eliminating subsequent machining.

The regular steel pedestal, when worn, is planed to a size requiring a definite thickness of shim, or plate, that is, 3/16 in., ¼ in., or 5/16 in. These liners are welded in place and when they become worn they are knocked

off and new ones welded on to replace them. The size required is stamped on the pedestal to save time for the welder. With the size in plain sight he does not have to measure each pedestal before applying the plate.

Passenger-car truck boxes are also reclaimed by bronze welding and are used indefinitely, except for breakage. As is shown in the accompanying photograph no machining is needed, the worn sides of the box are rebuilt with the bronze and checked with the handy gage shown so that they will slip over the pedestal with just the proper amount of clearance.

Truck frames are often found with a serious fracture, sometimes running for several inches. When this condition exists, the fracture is veed out with a cutting torch, care being taken to remove all of the crack. The truck frame is blocked so that it will not warp out of line and the area near the fracture is heated to a dull red. The crack is torch-welded with a mild-steel rod, occasionally passing the torch over the heated area to keep it hot. A slight reinforcement is added to the weld and all overflow is washed from the under side of the weld. If possible this side is also reinforced slightly. When the welding is completed the whole section is again heated thoroughly and allowed to normalize.

Another economical welding job is that of building up around the hole in the end of a buffer arm. It is often necessary to fill this pin hole because of excessive wear. Mild steel is used where redrilling is needed and the other worn parts are filled with wear-resisting metal, such as tire steel, applied with a slightly carbonizing flame.

Hundreds of freight-car door rollers are always handy to the welding bench where the welder can fill the holes in a few of these whenever time permits. These cast-iron rollers are drilled and countersunk from both sides previous to welding so that there will be a good bond between the base metal and the applied bronze. The rollers are drilled to size after welding.

On a number of passenger coaches the metal roof rusted through near the junction of the roof and the side panel. The rusted section is removed with a cutting torch, using a small tip and holding the torch almost parallel to the cut. This method of cutting leaves a kerf straight and free from oxide. Sheets of No. 16 gage, of the correct width, are formed in the boiler shop to the correct radius. These pieces are made in 6-ft.

Much of the older type passenger equipment used on the small road offers an opportunity for repair work by welding methods. Below are truck pedestal and brake head reclamation, building up truck boxes by welding and, at the right, a repair job on a passenger car truck frame in which a serious fracture was discovered

strips and are held in place and tacked with either the electric arc or acetylene process. When tacked every 10 in. or so the welder than back-welds the strip securely in place.

Welding is not used as much in making freight-car repairs, although there is an occasional call for a welder to apply a patch on a hopper door or to rebuild a worn brake post on a truck with stationary brake-hanger posts. On truck sides having removable hanger pins, the pin holes are often worn oblong, sometimes as much as ⅜ in. Due to the construction of these side frames it is an expensive job to fill these holes and redrill them. Therefore, several methods of repairs have been tried. The most successful and economical is to fashion a small piece of steel in the shape of a crescent. The piece should have an inside diameter about 1/32 in. larger than the brake-hanger pin. A substitute pin is slipped in place and the crescent-shaped pieces are inserted in the holes to compensate for the wear. These pieces are then welded as solidly as possible. The substitute pin is now removed leaving the holes true to size. When the hole in the brake hanger is plugged and redrilled the brake beam will be held in its correct position and not be in danger of dropping on the ground.

Terminal Conditioning Of Pullman Cars*

By W. T. Kidwell

In addition to the daily handling of Pullman cars in and out of the yard, the testing of and repairs to air brakes, trucks and running gear, there are such features as car cleaning, maintenance of the lighting and air-conditioning systems, the thousand and one items of hardware that have to be maintained, painting, upholstering, exchange of linen, stocking car with supplies, etc., which the Pullman Company has to worry about.

Pullman cars have to be aired out, rubbish collected and removed; plush, carpet and bedding vacuumized, windows cleaned and interior finish wiped down. The rubber tiling is scrubbed; wash basins, hoppers, metal work and hardware are cleaned and polished. Linen is exchanged and car supplies checked.

At certain periods the cars are given special strip cleaning when bedding, seats, seat backs, etc., are set aside, and the car thoroughly blown out with compressed air. Also, as parts of the inside finish show signs of dullness the woodwork, headlinings and bunklinings are thoroughly washed and chamoised, and certain parts polished with wax. The carpet is removed and blown with compressed air. Blankets, mattresses and pillow covers are exchanged and those removed sent out for special cleaning. Upholstering is carefully inspected and repaired. Painters are constantly at work refinishing damaged or faded parts of the inside finish.

Lighting and Power

When the car leaves a terminal the lighting equipment is on its own. If something went wrong there would be no one, in most cases, available to make repairs until the car reached the end of its run. To furnish ample power and steady lights the equipment must be fully automatic. It must receive inspections and periodical attention during the yard layover to assure its good operating condition. The power is provided by a belt-driven generator and battery located under the car, controlled by regulators usually located inside the car. It operates the same as an automobile system, the generator furnishing power for the lights, fans, electric razors and other electric appliances, and for charging the battery while the car is running. When the car is standing the battery furnishes power for these devices.

The battery must be inspected for loose connections, proper ventilation and the box cleaned out. Water has to be added occasionally, the same as in an automobile battery. Generator brushes wear out, get stuck with dirt; bearings develop defects and have to be replaced. The belt has to be inspected for wear and other conditions, and has to be replaced from time to time. Generator suspensions, pulleys and belt tension apparatus must be inspected for defects. Regulators use carbon discs and are affected by dust, overheating and adjustments, and require checking at regular intervals. These are all items the car lighting man must check up on in addition to seeing that the wiring is not grounded, repairing switches, changing burnt-out bulbs and various other details inside of the car.

Air Conditioning and Winter Heating

If the generator or battery fails, power for the lighting system can be obtained temporarily from an adjoining car by connecting the two with a train-line connector provided for this purpose, but there is no similar means of getting cooled air when the air conditioning apparatus fails. Inspection of this apparatus is therefore doubly important. These systems consist essentially of an air circulating system including apparatus for keeping the air in motion, cooling, heating, filtering and dehumidifying. The cooling apparatus being the principal parts may be one of several mechanical types, or a steam ejector or an ice system, all in common use on Pullman cars, and operate much the same as household refrigerators except on a larger scale.

This apparatus is also fully automatic and only the closest attention at terminals by skilled maintenance men can provide the necessary assurance that it will operate properly throughout the trip. There are many operating parts that wear out and get out of adjustment. Various kinds of lubricants are used periodically. Air filters, strainers, condensers, motors, speed controls and various control boxes have to be cleaned. Operating pressures, the adjustment of pressure switches and thermostatic valves require close and careful checking while the car is laying over in the yard. These, together with many details of lesser importance, keep the air-conditioning maintenance man always on the alert if he is to be a successful trouble shooter.

It is the cooling equipment in the summer and the heating equipment in winter that he has to worry about. Along with air conditioning came the automatic control of temperature within the car when heat is required. This has progressed along with other features developed by the car builders. The passenger riding in the later type cars today can set the temperature in his room to suit his individual idea and this temperature is maintained automatically. There are 45 automatic steam valves and 21 heating thermostats on the latest type of roomette car. In addition to this there are an equal number of relays, control switches, and the necessary wiring to complete this system of control. There is much of this apparatus to be looked over and repaired while the car lays over in the yard.

The hardware in a car is something else that meets the eye—and a passenger is quick to complain if some-

* Abstract of a short paper presented before the March 18 meeting of the Car Department Association of St. Louis. Mr. Kidwell is yard foreman of the Pullman Company at St. Louis, Mo.

thing doesn't work right. Such items as door locks, handles, hinges, holders and checks, subject to severe service, require considerable attention. Water faucets must always provide a liberal flow of water, and not leak; basin drains must be kept clean so water will drain out quickly. There is the water raising system with its automatic air-pressure control valves, filling valves, strainers, etc., that have to be looked after.

Hopper valves, especially on newer cars where the hopper folds back into a small cabinet, are highly complicated pieces of mechanism and subject to such defects as those caused by small grains of sand lodging on the valve seat, getting out of adjustment, worn gaskets, etc. Window glasses and mirrors get broken; window shades get out of fix, screws come loose that may catch and tear a passenger's clothing. These, together with hundreds of smaller items of hardware on a car, require the constant attention of highly skilled mechanics.

The casual observer hasn't the slightest conception of what is required in the way of yard maintenance to present a car in neat and orderly appearance, with all the facilities provided and functioning properly for his use and comfort. Were he to step into a railroad yard and watch the maintenance organization board the car and look after their work, to say he would be amazed is only putting it mildly; but it is a vital part of the Pullman service, and it is only a part of the whole job because, as all of you know only too well, the part your organizations take care of is equally voluminous and complicated. All of us, if we are to work together smoothly and efficiently must know something of the other fellow's job. What we are providing for the railroad passenger is something he accepts as a single unit when he buys his ticket, and to produce this successfully we must work as a single unit.

Beech Grove Freight-Car Shop Methods

(*Continued from page 237*)

The paint at the bottom of each drum is usually thinned out slightly to make sure that it will flow freely. Exclusion of air from the paint cylinder avoids any possibility of the paint drying on cylinder walls or piston packing grooves and thus making the pump inoperative.

The use of this paint pumping equipment saves much handling of heavy paint drums, and the distribution of the paint at the outside spigots is found to save time and promote cleanliness in the paint house. Drip buckets are used to avoid waste and keep the outside grounds clean. Paint supplies are always easily available and are kept in a well-mixed, warm and easy-flowing condition, the latter being a particular advantage in winter when low temperatures prevail.

Spectacle-Type Safety Goggle

An on-center safety goggle of the spectacle type has been announced by the American Optical Company, Southbridge, Mass. The features of this goggle include a double-braced bridge developed for hard usage, a design that conforms to the orbit of the eye, comfortable rocking pads and insulated, heat-resisting temples that are perspiration proof. The goggles are available in three eye and bridge sizes. They are equipped with Super Armorplate clear or Calobar lenses.

On-center safety goggle made by the American Optical Company—It can be equipped with wire-mesh side shields

In addition, this goggle can be obtained with wire-mesh side shields which give extra protection against particles striking from the sides. These screens are non-corroding and easily cleaned.

* * *

A neat and impressive safety first board which first greets the eye on entering the Beech Grove, Ind., shops of the Big Four

High Spots in
Railway Affairs . . .

Daniel Willard Made Chairman

"Uncle Dan" Willard, as he is familiarly known, was advanced to the newly created office of chairman of the board of the Baltimore & Ohio at the end of April, when at 80 he resigned the presidency to which Roy B. White, president of the Western Union, succeeded. Few railroad executives, if any, have made such a deep place for themselves in the hearts of railroaders, as well as of the general public. He is listened to attentively in Washington, both by the Administration and on The Hill. He is held in high regard by railway executives, even though he has a mind of his own and knows how to fight—and fight hard. He rates high in the minds of railroad workers. Few executives have had so varied an experience in climbing from the bottom of the ladder to the highest rung. Mr. Willard has an unusually keen appreciation of the importance of good public relations, as well as good employee relations. Certainly he has understood how to appeal to the public mind and sell his railroad, as well as railroading in general. He demonstrated the value of pageantry to that end in the celebration of the centenary of the Baltimore & Ohio in 1927. Summoning Ed Hungerford, with his rare gift of showmanship, they staged The Fair of the Iron Horse at Halethorpe. During its existence of only 21 days, a million and a quarter people flocked to its gates. It proved to be the forerunner of The Wings of a Century at the Chicago Exposition, and Railroads on Parade at the New York World's Fair.

Lord Stamp Killed

The "strafing" of Britain was brought home more keenly to Americans, and especially to railroaders, in the loss on the night of April 16 of Lord (Josiah) Stamp, chairman and president of the executive committee of the London Midland & Scottish Railway, and an internationally known economist. He was killed instantly in a Nazi air raid, at his home in Kent, a suburb of London, together with Lady Stamp and their eldest son. Only a little more than a month before, on March 7, he had presided at the annual meeting of the L. M. S. On that occasion he paid a high tribute to the late Lionel Hichens, a director of the company, speaking of him as "another victim on Hitler's murderous list." Lord Stamp was not born a member of a titled family, but started his career at 16 as a minor civil service clerk, and for 23 years remained in government tax work. During his spare time he studied at the London University, finally winning his doctorate. He was knighted for his service on income tax problems and represented Great Britain in drafting the Dawes and Young Plans in 1924 and 1929, respectively. In 1938 he was raised to the peerage. Lord Stamp did much to transform the L. M. S., by bringing a scholarly approach to its problems. This is well illustrated by the establishment in 1930 of a department of research, with a vice-president in charge, and also by the organization of free evening classes for employees, and then the establishment of the School of Transport for railroad officers.

The Safety Problem

Accidents have been on the increase in industry and transportation as production has been speeded up for war materials and to meet the demands of our national defense program. The exposure possibilities have been very greatly increased; at the same time new and untrained workers have been taken on in large numbers. One industrial community has even found that the increase in traffic accidents has been due very largely to the increased number of workers motoring back and forth between their homes and jobs. Loss of time and material caused by preventable accidents is just as serious as that caused by sabotage. The experience on many railroads has indicated that it is possible largely to reduce accidents if adequate accident prevention programs are aggressively promoted. Is there any good reason why the roads in general cannot approximate the high standard of performance of those that are now in the lead?

Railroad Research In Time of War

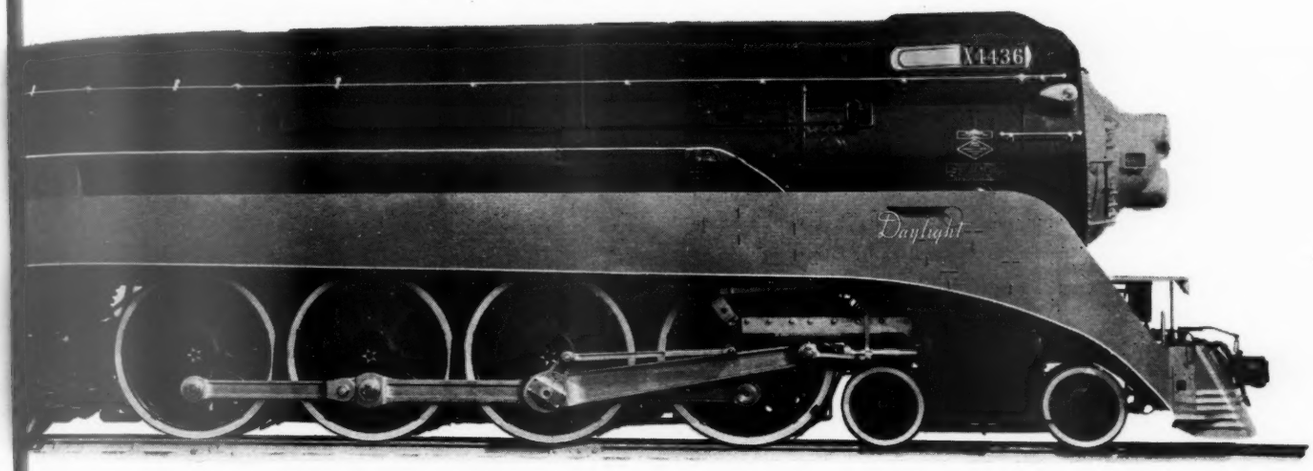
The late Lord Stamp of the London Midland & Scottish Railway, was justly proud of the research department he established on that road in 1930. In his address, as chairman at the annual meeting of the L. M. S. in March, he referred to its adaptability to war requirements. "Wartime conditions," he said, "have given rise to many problems on which the work of our research department has been of very great value. This is a scientific war, and such problems as substitute materials, salvage, A. R. P. (Air Raid Protection) and blackout can only be solved quickly and effectively by scientific methods. Research in government establishments can suggest general solutions, but your organization benefits greatly in having its own department to adapt these general principles to its particular needs. Let me give you two examples. Signal boxes must remain in action during air raids, and you know the danger from flying glass. The research department began work on this problem before the war, and when the need arose we were able to treat the windows of our signal boxes so effectively without interfering with clear vision, that in boxes so treated we have not yet had a single man injured by glass splinters. In one case the signalman was literally wrapped in glass without being scratched. You can guess what this has meant to the confidence of the men and, therefore, to operating efficiency. Then the innumerable lighting problems of the blackout in goods sheds (freight houses), marshalling yards (classification yards), and elsewhere have been tackled jointly by our lighting section, and the research department, and scientific methods have enabled us to combine safety from observation with the best permissible lighting."

"Gadgets" and The World War

Were it not for the seriousness of the situation in Britain, and particularly in London, one could get a real laugh from some of the discussions in our British contemporary, the Railway Gazette. So far as the appearance of that paper is concerned, one would hardly imagine that it was published in the focal spot of the World War. In spite of the toll that the war is taking, we find alongside of articles and editorials on the railways in the war, the same sort of pithy comment about ordinary details as in pre-war days. A typical instance of this is the fact that on one of its editorial pages containing a discussion of "Railways in the War Effort," there is a shorter comment on "An Irrepressible Word." "We thought," says the Railway Gazette, "that the word 'gadget' had relapsed into the obscurity in which we hope in due course will bury other elastic terms of ephemeral value, such as 'Blitz,' 'Molotov' and 'axis,' and are glad that the Air Ministry has given a lead toward its suppression by ascribing the growing toll of enemy night bombers to 'other devices,' which effectively conveys 'gadgets' to the unlearned mind, without shocking the sense of euphony." Then it makes this peculiar statement: "It is a misfortune of the railways that their most commonplace equipment remains perpetually novel and surprising to a large section of the public." American railroad men might well regard this latter fact as fortunate, rather than unfortunate. Certainly the American railroads owe a great deal to the so-called railroad fans, who boost for them, in season and out of season, and to whom no detail of railroading seems to lose its novelty and appeal.

(*Turn to second left-hand page*)

GREATER HAULING CAPACITY...



20 new *Daylights* being delivered by LIMA to the Southern Pacific

These twenty new and improved DAYLIGHTS bring the total fleet up to forty of this type of Super-Power Streamlined Steam Locomotives that have been built by Lima for the Southern Pacific. The Locomotives will be used to power the new "Overnight" passenger trains that the Railroad has inaugurated between San Francisco and Los Angeles as well as the famous "Daylight" trains between the two cities. In addition to passenger service, these Locomotives will also be used to power the overnight "Hotshot" freight that the Southern Pacific has so successfully been using to reclaim LCL freight.

The Southern Pacific has recently placed an additional order for ten more of these locomotives which will bring the DAYLIGHT fleet up to fifty high-speed Super-Power Lima-built Locomotives.

INCORPORATED, LIMA, OHIO

NEWS

A. A. R. Appropriates $83,000 for Counterbalance Tests

DIRECTORS of the Association of American Railroads at their April meeting in Washington, D. C., approved a recommendation of the Mechanical Division and appropriated $83,000 for tests of counterbalances for locomotive wheels. The location of the tests has not been determined, but it was stated that they should be conducted at some point where there would be available 20 miles of "reasonably straight" track, including five miles of tangent.

Symposium on Railway Motive Power for A. S. M. E. Meeting

Several papers on the design, operation, utilization, etc., of steam, Diesel-electric, and electric locomotives give promise of particularly interesting Railroad Division sessions during the semi-annual meeting of the American Society of Mechanical Engineers to be held at the Hotel Muehlebach, Kansas City, Mo., Monday, June 16, to Thursday, June 19, inclusive. For these sessions on Tuesday, June 17, the following program has been arranged:

Comparison of Operation of Steam vs. Diesel-Electric Locomotives in Railroad Service, by E. E. Chapman, mechanical assistant, Atchison, Topeka & Santa Fe.

Modern Steam Passenger Locomotive—Research and Design, by P. W. Kiefer, chief engineer motive power and rolling stock, New York Central.

Utilization of Steam Passenger Locomotives, by A. A. Raymond, superintendent fuel and locomotive performance, New York Central.

The Modern Steam Locomotive in Freight Service, by C. E. Pond, assistant to superintendent motive power, Norfolk & Western.

Electric Locomotive Operation, by H. C. Griffith, electrical engineer, Pennsylvania Railroad.

Advance in Locomotive Tender Design, by M. C. Haber, mechanical engineer, Research and Mechanical Standards Department, Union Pacific.

Other divisions contributing to the technical program for the semi-annual meeting are Power, Process Industries, Materials Handling, Fuels, Hydraulic, Heat Transfer, and Management. The Engineers' Council for Professional Development is also sponsoring a series of sessions on topics of broad professional import.

Sir Nigel Gresley

SIR Herbert Nigel Gresley, chief mechanical engineer of the (British) London & North Eastern since 1923 and locomotive engineer of its predecessor the Great Northern from 1911 to 1922, died at Hertford, England, on April 5. Sir Nigel, as he has been known in recent years, had an unusual career. It began at the Crew Works of the London & North Western where he served his apprenticeship under the late F. W. Webb. He later served under Sir John Aspinall and H. A. Ivatt whom he succeeded as locomotive engineer on the Great Northern. His experience included the supervision of the test room on the Lancashire & Yorkshire at the Harwich shops, locomotive running shed foreman, outdoor assistant in the carriage and wagon department, assistant works manager and assistant superintendent of the carriage and wagon department. In 1905, he entered the service of the Great Northern as carriage and wagon superintendent, from which position he succeeded Mr. Ivatt as locomotive engineer.

The contributions to railway engineering for which Sir Nigel is best known are the three-cylinder single-expansion locomotive which he long championed and the combination valve motion by means of which the two outside valve gears provided motion for the valves of all three cylinders; the development of the Pacific type to accommodate wide fireboxes and large grate areas and extensive, though ultimately unsuccessful, experimentation with a high-pressure water tube boiler. He had much to do with the development of high speeds in England; the streamlined "Silver Link" locomotive, designed for the "Silver Jubilee" train, has to its credit on a special run a speed of 112 m.p.h. On its regular run it made 232 miles in four hours.

In the field of rolling stock, Sir Nigel is best known for the development of the double-bolster trucks now standard under L. & N. E. passenger cars and of the system of articulation in which two or more car bodies are carried on three or more trucks. He also is said to have introduced electric cooking on trains in England.

Sir Nigel was long an advocate of the establishment of a locomotive testing plant in England, and it said that he had made some progress in gaining acceptance for the idea, which the advent of the war swept away.

Baldwin Delivers Its First Army Tank

THE first medium M-3 combat tank built by the Baldwin Locomotive Works was put through its paces on April 23 in a special ceremony at Eddystone, Pa., and turned over to Major D. N. Houseman, executive officer, Philadelphia Ordnance District, by Vice-President W. H. Winterrowd. Before a body of distinguished guests and under the shadow of two eight-in. railway guns recently built by Baldwin, Number one tank ran 30 m. p. h. on the test track. Among other demonstrations of efficiency it was braked within 40 feet after a speed of 20 m. p. h.; traveled successfully over a strip of railroad ties and ran down flag markers placed in consecutively difficult positions. Also the tank was driven several times over a specially prepared mound of earth approximately 40 ft. high at the center and having an incline of approximately 50 degrees.

The Baldwin M-3 tank weighs 29 tons and is powered by a 400-hp. radial Wright Cyclone engine. It carries a crew of seven, and a battery of guns including a 75-mm. semi-automatic, a 37-mm. semi-automatic and four 30-caliber machine guns. The tank was turned out at the plant three-quarters of a year ahead of schedule. It is expected that others will follow soon.

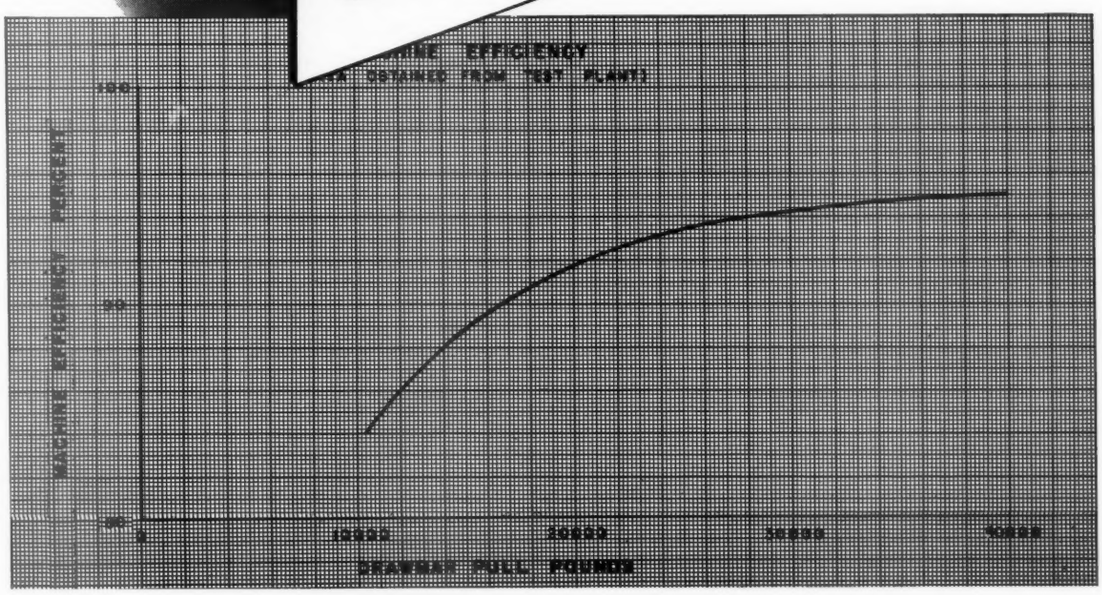
Brief addresses were delivered at the ceremony by Mr. Winterrowd, C. E. Brinley, president of Baldwin; Major Houseman; Under-Secretary of War, R. P. Patterson; Colonel W. W. Warner, chief of Artillery Division, Ordnance Department and William L. Batt, deputy director, Office of Production Management.

The Baldwin Locomotive Works turned out its first medium M-3 fighting tank on April 23

(Turn to next left-hand page)

Machine Efficiency

FRANKLIN SYSTEM OF STEAM DISTRIBUTION



MACHINE EFFICIENCY (DATA OBTAINED FROM TEST PLANT)

The inherent advantages of the Franklin System of Steam Distribution over a conventional valve gear and piston type valve, permit a marked improvement in the machine efficiency of the locomotive. Outstanding features that contribute towards this are:

1. REDUCED FRICTION

(a) The short intermittent lift of the poppet valves, as contrasted with the travel of the piston valves, with their rings, drastically reduces the power required for valve operation.

(b) By driving direct from the crosshead and eliminating the conventional outside cranks and rods necessary in a piston valve arrangement, there is a further reduction in the power necessary to actuate the steam distribution system — at 500 r.p.m. the poppet valves and their driving mechanism require only 3.30 horsepower.

2. BETTER LUBRICATION

Piston valves require lubrication over the entire sliding surface. Poppet valves require lubrication on their valve stems only, which are not in direct contact with the steam. The mechanisms actuating the poppet valves (valve gear box and cam box) are fitted with anti-friction bearings and operate in a bath of oil.

3. LIGHTER IN WEIGHT

A twelve inch piston valve weighs approximately 132 lb. The weight of the multiple poppet valves to be moved at one time is approximately 13 lb.

FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK
CHICAGO
MONTREAL

Equipment Depreciation Rates

EQUIPMENT depreciation rates for six railroads, including the New York Central and the Norfolk & Western, have been prescribed by the Interstate Commerce Commission in a new series of sub-orders and modification of previous sub-orders in No. 15100, Depreciation Charges of Steam Railroad Companies.

The composite percentage for the N. Y. C. is 3.22 per cent, that for the N. & W., 3.62 per cent. Included in the prescribed rates for the N. Y. C. are those applicable to equipment leased from the Peoria & Eastern; another of the six sub-orders vacates a previous one which had prescribed rates for P. & E. equipment.

12,200 Air-Conditioned Cars

CLASS I railroads and the Pullman Company had 12,200 air-conditioned passenger cars in operation on January 1, according to the Association of American Railroads. This was an increase of 485 compared with the number of air-conditioned passenger cars on January 1, 1940.

Of the total number of such cars, Class I roads on January 1 had 6,961, an increase of 365 compared with the same date last year. The Pullman Company had 5,239 air-conditioned passenger cars in operation, or an increase of 120 compared with January 1, 1940.

Car Builders Complain of Steel Shortages

FREIGHT car builders, through the American Railway Car Institute, are filing complaints of postponed schedules of steel deliveries which are causing shutdowns of their erection tracks. The attention of the Office of Production Management at Washington was drawn to the seriousness of the steel situation about a month ago by both the railroads and builders. Preference delivery of steel was requested to insure continued immediate production on the large number of freight cars urgently needed to handle the increasing volume of defense production. No action has been taken and the situation has since become even more acute.

Plant shutdowns are many. One of the leading plants reports an actual forced shutdown of its erection track for as much as 60 days, or an estimated loss of productive capacity of about 1,000 cars for this particular plant. Steel deliveries have been postponed two and three months—with several plants, in some instances, unable to secure any definite delivery promise. Several steel mills are said to be refusing further orders.

Equally serious—with the enforced delay in freight car deliveries—is the loss of labor. Apprehension is felt that with the shutdown of plants skilled labor will disperse not to be regained when steel becomes available. The opinion prevails that if the large volume of cars now awaiting production and the larger volume of orders expected for 1942 and 1943 are to be delivered to the railroads as required, some provision making steel available to the builders is immediately necessary.

Eastman Says Government Should Buy the Cars

CHAIRMAN Joseph B. Eastman of the Interstate Commerce Commission feels that the cost of any excess transportation demands upon the railroads in anticipation of national defense needs over and above those normally needed by the country should be borne by the federal government. This view was made known in an address delivered by the I. C. C. chairman before the National Association of Mutual Savings Banks at Philadelphia, Pa., on May 7.

Mr. Eastman feels that the country's transportation system can carry the burdens which will be placed upon it, but he also is aware that there are possible dangers in the transportation situation. The chief danger lies, he thinks, in the things that cannot be or are not foreseen and the failure to plan and be ready for all possible contingencies. "Have the railroads," he asked, "and the other carriers been told clearly and definitely by those in charge of defense production what they will be certainly called upon to do if that program is stepped up to the utmost possible extent?

If the railroads and other carriers have this information, Mr. Eastman can see two particular dangers. One lies in the fact that the railroads and other carriers are private enterprises and it is the duty of the managements to safeguard the interests of the owners. As a result, the tendency will be, he believes, in such circumstances to be conservative in assuming financial obligations which will be permanent, in order to meet the defense needs which, it is hoped, will be temporary.

The other danger, in Mr. Eastman's opinion, is that the transportation problem will be dealt with too much as though it were a railroad problem exclusively.

A. A. R. Approves Freight Car-Buying Program

A PROGRAM calling for a net increase of 120,000 cars for the anticipated traffic of 1942 (43,680,000 carloads) and a further addition of 150,000 cars for the traffic of 1943 (estimated at 48,048,000 carloads) was adopted by member roads of the Association of American Railroads at its spring meeting at Chicago on May 12. This program is in addition to the one adopted a year ago, which called for the acquisition of 100,000 new cars for handling the 1941 traffic. According to a statement issued by the Association, the railroads will have 1,617,000 serviceable cars when the peak load of 1941 occurs in October. Of these, 168,000 will be new and 27,000 will be cars that have been rebuilt since the war broke out. This will be 156,000 more serviceable cars than they had when they handled the peak business of October, 1939. In addition, they will have 1,000 new locomotives, including 375 steam and 625 electric and Diesel, in service in October.

Discussion of the car-building capacity of plants indicated that car builders have a productive capacity of about 150,000 cars annually, while that of the railroads' own shops is about 60,000 cars a year. It was the consensus of the meeting that priorities will not have to be established in order to provide the commercial freight car builders, as well as railroad shops, with the steel and other materials needed for the new equipment unless the Office of Production Management and the defense commission are forced to establish priorities generally. Ralph Budd, president of the Chicago, Burlington & Quincy, and transportation commissioner of the Advisory Commission to the Council of National Defense, cautioned the railroads however, not to make more inroads upon the nation's steel supply than is necessary to carry out their equipment program.

The adoption of this program followed a survey of equipment needs which the directors of the A. A. R., at their meeting in Washington on April 25, directed the Car Service Division to make.

At a meeting on May 1, in connection with equipment to handle the current year's business President Pelley presented to the Priorities Division, Office of Production Management, a statement showing that railroad requirements for steel during the remainder of 1941 will total 4,914,556 tons. That figure includes requirements for rail, track materials, etc., as well as equipment, and 1,497,514 tons for the car builders and 103,622 tons for the locomotive builders.

Another subject discussed at the May 12 meeting of the Association was the possibility that the federal government may transfer many of the vessels now operating in intercoastal service and thus cause the diversion to the railroads of intercoastal traffic now moving via the Panama canal. As much as 40 per cent of the intercoastal tonnage, it was established, would move by rail. This would be equivalent to approximately 450 cars a day and in peak periods would amount to as much as 700 cars a day.

The meeting also considered the movement of grain from the southwest and approved an order, to be issued by the Car Service Division, directing eastern lines to return all western lines' box cars empty at once and calling upon western lines to route eastern lines box cars to owners, loaded, immediately.

Meanwhile the American Railway Car Institute has informed the Association of American Railroads that, if the car builders can succeed in increasing man-power and securing the necessary materials, they can produce up to 35,000 cars during the period October 1 to December 1, 1941, instead of 22,500 as had been previously estimated provided orders are placed immediately for this equipment and in lots of not less than 1,000 cars of each type. (It is estimated that the car builders are booked to capacity for delivery prior to the first of October.

Further, with this backlog, and running on an increasing schedule of production, a canvass of the industry indicates, if orders are placed with individual car building plants in lots of not less than 5,000 of each particular type of car required, that an additional 160,000 cars can be produced between January 1 and October 1, 1942. It is reported that deliveries of this number of cars, however, can be achieved only if orders and details are settled by July 1, 1941, and if they are cars of standard construction.

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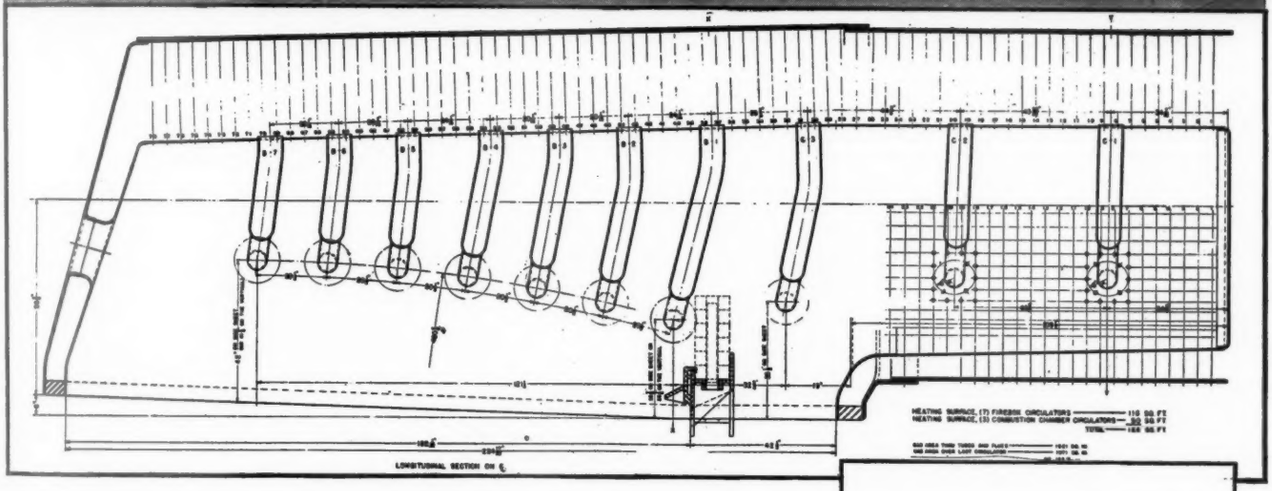
BETTER COMBUSTION
for modern freight locomotives through the application of
SECURITY CIRCULATORS



The problem of supporting brick arches of unusual length, which is the result of the demand for increased boiler horsepower, has been effectively solved by the Security Circulator, a development of the American Arch Company.

In addition to achieving the original object of improved support many other benefits have accrued. The reduction of honeycombing and cinder cutting lessens the maintenance of the boiler. The Security Circulator itself is extremely low in maintenance costs.

On the Security Circulators that have been installed during the last six years, performance has been thoroughly proved by over 10,000,000 locomotive miles of service.

Improved Arch Support for the largest fireboxes

★

Adapted to any type of locomotive

★

Reduced honeycombing, flue plugging and cinder cutting

★

Improved circulation in side water legs

AMERICAN ARCH CO., INC.

NEW YORK • CHICAGO **SECURITY CIRCULATOR DIVISION**

Southern Shopmen Vote for Six-Day Week

SOME 7,500 shopmen of the Southern, during the week of April 14, voted to cancel the five-day week clause in their contract, thus extending the basic work week from 40 to 48 hours. Cancellation in this manner is provided for in the contract. The management agreed to the cancellation and notified employees that the six-day week would be restored, effective May 1.

SKF President Gets Gantt Medal

WILLIAM L. Batt, president of SKF Industries, Inc., and deputy director, Production division, Office of Production Management, was awarded the 1940 Gantt Memorial Gold Medal at a dinner on April 22 in conjunction with a two-day management conference on national defense of the American Society of Mechanical Engineers in Philadelphia, Pa. The Gantt Gold Medal was established in 1929 and is awarded annually by a board made up of representatives of the A. S. M. E. and the Institute of Management. Mr. Batt was cited "for distinguished and liberal-minded leadership in the art, science and philosophy of industrial management in both private and public affairs."

Mr. Batt, in addition to his duties cited above, is chairman of the Business Advisory Council of the United States Department of Commerce; chairman of the division of engineering and industrial research of the National Research Council and chairman of the board of the American Management Association. He was president of the A. S. M. E. in 1936 and in 1938 acted as chairman of the executive committee of the Seventh International Management Conference in Washington, D. C.

Equipment Purchasing and Modernization Programs

The Alabama, Tennessee & Northern.—Authorization has been granted the Alabama, Tennessee & Northern by the district court to purchase a 300-hp. Diesel-electric locomotive. It has also been authorized to purchase two used locomotives from the Gulf, Mobile & Ohio.

Baltimore & Ohio.—The B. & O. has asked the Interstate Commerce Commission for authority to assume liability for $5,880,000 of equipment trust certificates, maturing in 10 equal annual installments of $588,000 on June 1 in each of the years from 1942 to 1951, inclusive. The proceeds will be used as part of the purchase price of new equipment costing a total of $7,400,510 and consisting of 150 50-ton, 50 ft. 6 in. steel box cars; 50 50-ton, 50 ft. 6 in. steel box cars with end door; 50 50-ton, 50 ft. 6 in. steel automobile box cars; 150 70-ton, 26 ft. 3⅜ in. steel hopper cars; 1,000 50-ton, 33 ft. steel hopper cars; 500 70-ton, 52 ft. 6 in. steel gondola cars; and 500 70-ton, 52 ft. 6 in. steel gondola cars.

The Carnegie-Illinois Steel Corporation.—The Carnegie-Illinois Steel Corp. is reported to be inquiring for 30 ingot cars of 125 tons' capacity.

Orders and Inquiries for New Equipment Placed Since the Closing of the May Issue

LOCOMOTIVE ORDERS

Road	No. of Locos.	Type of Loco.	Builder
Alabama, Tennessee & Northern	1	45-ton Diesel-elec.	General Electric Co.
Aluminum Co. of America	1[1]	650-hp. Diesel-elec.	Whitcomb Loco. Co.
Arcade & Attica	1	44-ton Diesel-elec.	General Electric Co.
Atlantic Steel Co.	1[2]	320-hp. Diesel-elec.	Whitcomb Loco. Co.
Brooklyn Navy Yard	1[3]	300-hp. Diesel-elec.	Whitcomb Loco. Co.
Canadian Pacific	20	4-6-2	Montreal Loco. Wks.
Canton	1	600-hp. Diesel-elec.	Electro-Motive Corp.
Chicago & North Western	1[1]	190-hp. Diesel-hydraulic	Whitcomb Loco. Co.
Chicago, Milwaukee, St. Paul & Pacific	6	380-hp. Diesel-elec.	Whitcomb Loco. Co.
	2	360-hp. Diesel-elec.	General Elec. Co.
Day & Zimmerman	4	380-hp. Diesel-elec.	Whitcomb Loco. Co.
Denver & Rio Grande Western	1	380-hp. Diesel-elec.	General Electric Co.
	3	5,400-hp. Diesel-elec.	Electro-Motive Corp.
	4	1,000-hp. Diesel-elec.	American Loco. Co.
	9	600-hp. Diesel-elec.	Baldwin Loco. Wks.
East Erie Commercial	1	65-ton Diesel-elec.	General Electric Co.
Electro-Metallurgical	2[3]	500-hp. Diesel-elec.	Whitcomb Loco. Co.
Erie City Iron Works	1[2]	190-hp. Gas-mech.	Whitcomb Loco. Co.
Houston Shipbuilding Corp.	3	30-ton Diesel-elec.	Whitcomb Loco. Co.
Maxon Construction Co.	1[3]	300-hp. Diesel-elec.	Whitcomb Loco. Co.
Midvale Co.	2[2]	320-hp. Diesel-elec.	Whitcomb Loco. Co.
	1[1]	193-hp. Diesel-elec.	
Minneapolis, St. Paul & Sault Ste Marie	1	380-hp. Diesel-elec.	General Electric Co.
Missouri & Illinois Bridge & Belt	1	380-hp. Diesel-elec.	General Electric Co.
Newfoundland	1[4]	2-8-2	Montreal Loco. Wks.
New York, New Haven & Hartford	5[5]	4,000-hp. Diesel-elec.	American Loco. Co.
	6	44-ton Diesel-elec.	General Elec. Co.
Pennsylvania Forge Co.	1[1]	190-hp. Gas-mech.	Whitcomb Loco. Co.
Philadelphia, Bethlehem & New England	2	600-hp. Diesel-elec.	Electro-Motive Corp.
Robervale & Saguenay	1[2]	386-hp. Diesel-elec.	Whitcomb Loco. Co.
Reading	2[6]	1,000-hp. Diesel-elec.	Electro-Motive Corp.
	2[6]	600-hp. Diesel-elec.	
	2[6]	600-hp. Diesel-elec.	American Loco. Co.
Roebling's, John A. Sons Co.	1[1]	190-hp. Diesel-hydraulic	Whitcomb Loco. Co.
Scullin Steel Co.	1[3]	320-hp. Diesel-elec.	Whitcomb Loco. Co.
South Buffalo	3	1,000-hp. Diesel-elec.	American Loco. Co.
Steelton & Highspire	2	70-ton Diesel-elec.	General Electric Co.
Stone & Webster	2[1]	500-hp. Diesel-elec.	Whitcomb Loco. Co.
Texas Pacific-Missouri Pacific-Terminal R. R. of New Orleans	1	660-hp. Diesel-elec.	American Loco. Co.
Union Carbide	1[3]	300-hp. Diesel-elec.	Whitcomb Loco. Co.
United States Navy Dept.	1	50-ton Diesel-elec.	Whitcomb Loco. Co.
	1	50-ton Diesel-elec.	Atlas Car & Mfg. Co.
	2[7]	50-ton Diesel-elec.	H. K. Porter Co.
U. S. War Dept.	5[2]	190-hp. Gas-mech.	Whitcomb Loco. Co.
	5	2-6-2	American Loco. Co.
	8	45-ton Diesel-elec.	General Electric Co.
Vanadium Corp. of America	1[2]	210-hp. Diesel-mech.	Whitcomb Loco. Co.
Wabash	1	660-hp. Diesel-elec.	American Loco. Co.
Wabash Portland Cement Co.	1[2]	190-hp. Diesel-mech.	Whitcomb Loco. Co.
Westinghouse Elec. & Mfg. Co.	1[1]	320-hp. Diesel-elec.	Whitcomb Loco. Co.

LOCOMOTIVE INQUIRIES

Canadian Pacific[8]	15	4-6-2	
New York Central	15	4-8-2	
	15	350 and 600-hp. Diesel electric	

FREIGHT-CAR ORDERS

Road	No. of Cars	Type of Car	Builder
American Gas & Electric Co.	6	100-ton well	American Car & Fdry.
American Locomotive Co.	2	100-ton flat	American Car & Fdry.
American Refrig. Transit Co.	150	Refrigerator	Co. shops
Ann Arbor	25	55-ton hopper	Co. shops
Atlantic Coast Line	800	50-ton box	American Car & Fdry.
	800	50-ton box	Pullman-Standard
	700	50-ton auto	American Car & Fdry.
	300	50-ton furniture	Mt. Vernon
	200	50-ton h.s. gondalos	Bethlehem
	100	70-ton covered hopper	Bethlehem
Baltimore & Ohio	27	70-ton gondola	Bethlehem Steel
	100	Cabooses	Co. shops
Boston & Maine	4	90-ton depressed center	Co. shops
Canadian Pacific	250	50-ton hopper	Magor Car Corp.
Chicago & North Western	500	50-ton box	American Car & Fdry.
	500	50-ton box	Pullman-Standard
Chicago, Rock Island & Pacific	1,000	50-ton box	Pressed Steel Car
Delaware & Hudson	300	50-ton hopper	American Car & Fdry.
	200	50-ton gondola	
	50	70-ton covered hopper	
Detroit, Toledo & Ironton	50	Hopper	Greenville Steel Car Co.
Denver & Rio Grande Western	500	40-ton box	Pressed Steel Car Co.
	3	Flat	Co. shops
Erie	70	Caboose	Co. shops
Kansas City Southern	50	50-ton auto	Pullman-Standard
	20[9]	50-ton box	
	75[9]	70-ton hopper	
Lehigh & New England	15[10]	70-ton hopper-bottom	American Car & Fdry.
Minneapolis, St. Paul & Sault Ste. Marie	250	50-ton box	Pullman-Standard
Missouri Pacific	100	50-ton auto parts	American Car & Fdry.
New York Central	10[11]	Well	Despatch Shops, Inc.
	14	100-ton transformer	
	3,000	55-ton box	
New York, Chicago & St. Louis	18	70-ton covered hopper	American Car & Fdry.
Norfolk & Western	1,000	50-ton box	Ralston Steel Car
	200	50-ton box	Greenville Steel Car
Pere Marquette	25	70-ton covered hopper	American Car & Fdry.
Sanderson & Porter Co.	50	Box	General American
Southern	1,900	50-ton box	[12]
	500	70-ton flat	Mt. Vernon Car
	100	70-ton M. J. gondola	
	1,500	50-ton box[12]	Pullman-Standard

Southern Pacific	4	200-ton flat	Mt. Vernon Car
Union Pacific	100	Caboose	Mt. Vernon Car
	2,000	50-ton box	Company shops
	250	Automobile	
United States Government	50	6,000-gal. tank	American Car & Fdry.
	50	30-ton flat	
United States Navy	15	50-ton flat	American Car & Fdry.
Utah Copper Co.	75	100-ton ore	Pressed Steel
Wisconsin Central	150	50-ton box	Pullman-Standard

FREIGHT-CAR INQUIRIES

Atchison, Topeka & Santa Fe	100	Caboose	.....
	2,000	Freight	.....
Boston & Maine	600	40-ton box	.....
	500	50-ton gondola	.....
	500	50-ton twin hopper	.....
Delaware & Hudson	300	50-ton hopper	.....
	200	50-ton gondola	.....
	50	70-ton covered hopper	.....
Erie	5	90-ton flat	.....
Norfolk & Western	25	70-ton gondola	.....
Missouri Pacific	800	50-ton box	.....
	200	50-ton auto	.....
	50	70-ton covered cement	.....
Southern Pacific	2,500	Box	.....
Western Maryland	500	Box	.....
	300-500	Hopper	.....
	200	Drop-end gondola	.....
	25	Flat	.....
Western Pacific	350	50-ton box	.....
	350	50-ton flat	.....

PASSENGER-CAR ORDERS

Road	No. of Cars	Type of Car	Builder
Chicago, Rock Island & Pacific	7	Chair	Edw. G. Budd
	2	Dining	Edw. G. Budd
Denver & Rio Grande Western	4	Train Cars[13]	Pullman-Standard
Illinois Central	2	Dining	St. Louis Car
Southern	25	Bagg.-exp.	

PASSENGER-CAR INQUIRIES

Delaware, Lackawanna & Western[9]	10	Bagg.-exp.	.....

[1] Ordered in February; not previously reported in the *Railway Mechanical Engineer.*
[2] Ordered in January; not previously reported in the *Railway Mechanical Engineer.*
[3] Ordered in March; not previously reported in the *Railway Mechanical Engineer.*
[4] In addition to one reported in May issue.
[5] Double-end road locomotives for handling fast passenger and freight trains.
[6] Authorization for the purchase of ten Diesel-electric locomotives was reported in the May issue. The Baldwin Locomotive Works is expected to receive the order for the remaining four 600-hp. units.
[7] At a total cost of $50,118.
[8] Reported to be considering the purchase.
[9] For the Louisiana & Arkansas.
[10] With hatchway roof, for bulk cement.
[11] Order unconfirmed.
[12] Fifty of the box cars will have end doors and 50 end doors and auto loaders. Estimated cost of order for 2,500 cars placed with Mt. Vernon $7,500,000; 1,500 cars placed with Pullman-Standard $4,200,000.
[13] Streamlined passenger-train cars with a power plant in each car. The cars to comprise two 2-car passenger trains.

Chesapeake & Ohio.—The C. & O. has asked the Interstate Commerce Commission for authority to assume liability for $5,100,000 of serial equipment trust certificates to be sold at competitive bidding with an interest rate not to exceed 2½ per cent. The proceeds will be used as part payment of the purchase price of new equipment costing a total of $6,440,993 and consisting of 1,000 50-ton, 40-ft., 6 in., all-steel box cars; 1,000 50-ton, all-steel hopper cars; 50 50-ton, 50-ft., all-steel flat cars; 25 70-ton, 56-ft., all-steel flat cars; 10 125-ton, 56-ft., all-steel flat cars; six 125-ton 51-ft., 6¾ in., all-steel flat cars; four 125-ton 61-ft., 4¾ in., all-steel flat cars and 20 all-steel passenger coaches. The certificates have been dated May 1, 1941, and will mature in 10 equal annual installments on May 1 in each of the years from 1942 to 1951, inclusive.

Chicago & North Western.—The C. & N. W. has asked the Interstate Commerce Commission for authority to assume liability for $2,325,000 of equipment trust certificates, maturing in annual installments beginning July 1, 1942 and ending July 1, 1951, inclusive. The proceeds will be used as part of the purchase price of new equipment costing $3,100,000 and consisting of 1,000 50-ton, 40-ft., 6 in., all-steel box cars.

The Chicago, St. Paul, Minneapolis & Omaha.—The Milwaukee has applied to the Interstate Commerce Commission for approval of a sale to the Reconstruction Finance Corporation of $1,680,000 of 2½ per cent equipment trust certificates at par and accrued dividends. The certificates, dated July 1, 1941, would mature in 15 equal annual installments on July 1 of each year from 1942 to 1956. The application stated that the best bid received from private banking interests would have put the certificates on a 2⅛ per cent basis which the applicant regarded as unsatisfactory. The transaction would finance the acquisition from the American Car and Foundry Company of 700 all-steel box cars of 50 tons capacity.

The Delaware, Lackawanna & Western.—The D. L. & W. is reported to be contemplating the acquisition of 1,500 freight cars, comprising 1,000 box and 500 gondola cars.

Erie.—The Erie has asked the Interstate Commerce Commission for authority to assume liability for either $4,000,000 or $4,500,000 of equipment trust certificates, maturing in 10 equal annual installments beginning on May 15, 1942 and ending May 15, 1951. The proceeds will be used as part payment of the purchase price of new equipment costing a total of $5,000,000 and consisting of 800 50-ton box cars, 100 50-ton automobile cars, 100 50-ton furniture cars, 50 70-ton flat cars, 250 drop-end, mill type gondola cars, 50 covered hopper cars, 250 50-ton center dump hopper cars, five heavy-duty flat cars, and five express-baggage cars.

Great Northern.—Directors of the Great Northern on May 9, approved a program calling for the purchase of 17 Diesel-electric switching locomotives.

The Lehigh & New England.—The L. & N. E. is reported to be inquiring for from 200 to 500 center dump hopper cars of 50 tons' capacity.

The Lehigh Valley.—The L. V. is expected to enter the market for 500 65-ft. gondola cars, 400 40-ft. 6-in. box cars of 50 tons' capacity, 100 50-ft. 6-in. auto box cars of 50 tons' capacity and 10 special flat cars.

Louisville & Nashville.—The L. & N. has asked the Interstate Commerce Commission for authority to assume liability for $4,970,000 of equipment trust certificates, maturing in 10 equal annual installments of $497,000 on June 15 in each of the years from 1942 to 1951, inclusive. The proceeds will be used as part of the purchase price of new equipment costing a total of $5,522,223 and consisting of 1,000 50-ton, all-steel hopper cars, 1,000 50-ton, steel-sheathed, wood-lined box cars, and 100 50-ton, all-steel, wood-lined, double-door box cars.

Missouri Pacific.—The M. P. has asked the Interstate Commerce Commission for authority to assume liability for $2,895,000 of equipment trust certificates, maturing in 15 equal annual installments of $193,000 on June 16, in each of the years from 1942 to 1956, inclusive. The proceeds will be used as part payment of the purchase price of new equipment costing $3,872,936 and consisting of two 1,000-hp. Diesel-electric switchers, two 600-hp. Diesel-electric switchers, seven 44-ton Diesel-electric switchers, one double end control, rail motor car, 1,200 55-ton, all-steel hopper cars, and two 125-ton, depressed center, flat cars.

Montour.—The Montour has asked the Interstate Commerce Commission for authority to assume liability for $500,000 of equipment trust certificates, bearing interest at not more than 2½ per cent and maturing in five equal annual installments on June 16 in each of the years from 1942 to 1946, inclusive. The proceeds will be used as a part of the purchase price of new equipment costing a total of $702,381 and consisting of 300 all-steel, 50-ton hopper cars.

The Western Pacific.—The Western Pacific will ask the district court for authority to purchase three 5,400-hp. Diesel-electric locomotives.

Wheeling & Lake Erie.—The W. & L. E. has asked the Interstate Commerce Commission for authority to assume liability for $800,000 of equipment trust certificates, maturing in equal annual installments beginning May 15, 1942 and ending May 15, 1951. The proceeds will be used as part of the purchase price of new equipment costing a total of $1,116,500 and consisting of 500 all-steel, self-clearing, 60-ton hopper cars. The company informs the commission that no bid in excess of two per cent of par will be accepted.

(*Turn to second left-hand page*)

The

Can Pull-Pull-Pull

LIKE the proverbial bulldog which pulls and pulls and never quits—the EMC 5400 hp. Diesel, the world's most powerful freight locomotive, can outpull and outperform any steam locomotive thus far built. This "Bulldog of the Rails" has greatest tonnage moving capacity, can operate continuously over long runs, and with its dynamic braking feature can handle trains down heavy grades faster, safer and with minimum brake applications—and at a greatly reduced cost of operation.

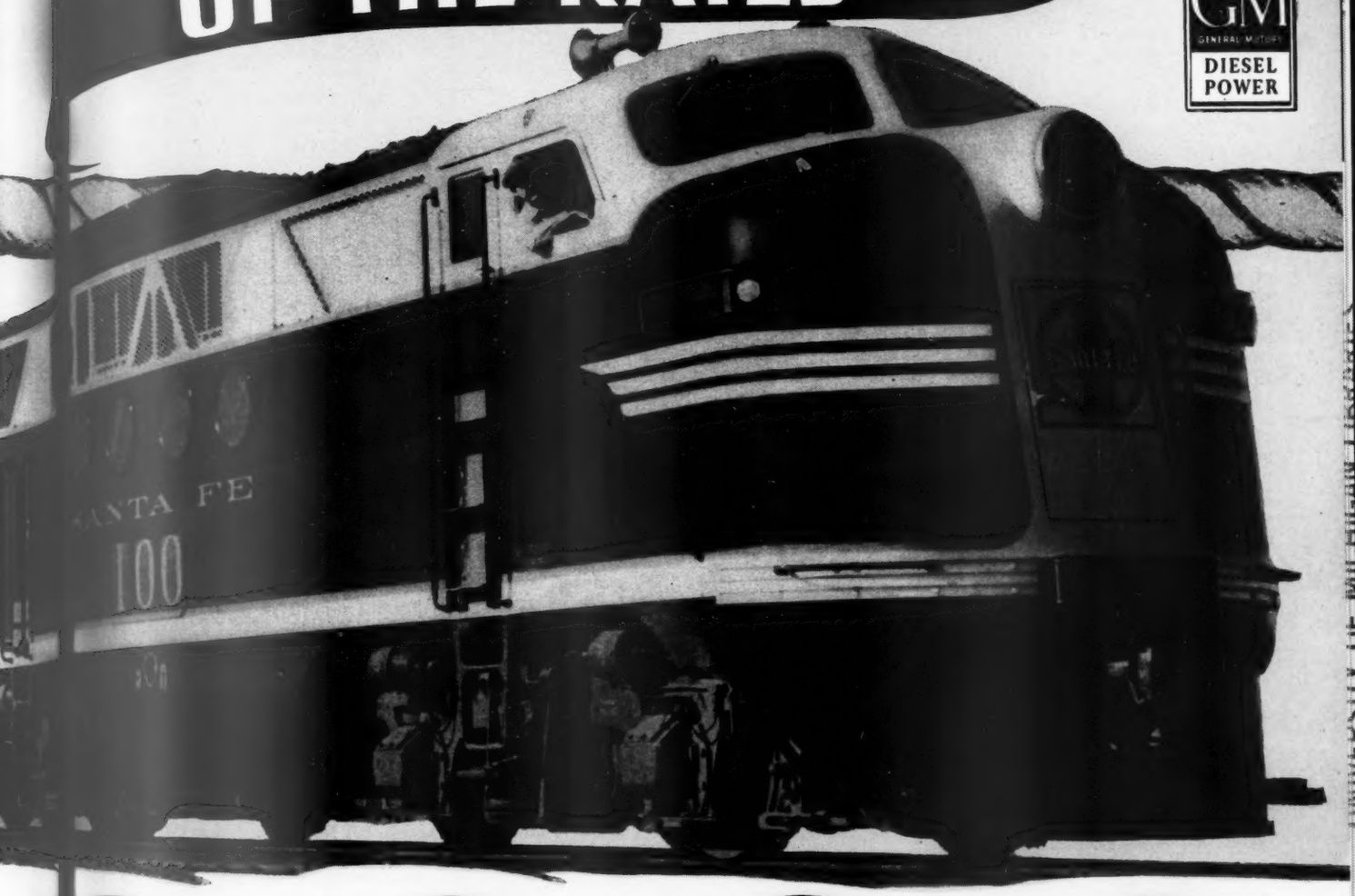
On a recent test trip between Argentine, Kansas, and Los Angeles, with no attempt for speed or tonnage records, Santa Fe 5400 hp. Diesel freight locomotive No. 100 with a maximum of 68 cars (3,150 tons) made the 1761.8 miles in 54 hrs. 35½ mins.

ELECTRO-MOTIVE

SUBSIDIARY OF GENERAL MOTORS

Bulldog OF THE RAILS

GM GENERAL MOTORS DIESEL POWER



Pull-Pull-Pull-Pull

running time—an average speed of 32.3 m.p.h. The locomotive demonstrated ample capacity for handling much heavier trains and at subsantially higher speeds.

One of the most outstanding features of the entire performance was the ability of this Diesel locomotive to make the entire trip with only four stops required for fuel and water; whereas a total of seven steam locomotives would generally be required to handle the same train on the same run with 12 stops required for fuel and water and 16 additional stops for water only.

BIGGER OPERATING ECONOMIES FOLLOW DIESEL EXPANSION

E CORPORATION

RS LA GRANGE, ILLINOIS, U. S. A.

Supply Trade Notes

A. VAN HASSEL, president of the Magor Car Corporation, has been elected a director of the Ralston Steel Car Company.

◆

PAXTON-MITCHELL COMPANY. — *P. A. Pounds* has been appointed vice-president and assistant general manager; *E. B. Christensen,* secretary and treasurer and *David J. Miller,* sales manager of the Paxton-Mitchell Company, Omaha, Neb.

◆

O. C. DURYEA CORPORATION.—*John A. Dillon* has been elected vice-president of the O. C. Duryea Corporation, with headquarters at New York. Mr. Dillon was formerly vice-president in charge of Eastern sales of the Pittsburgh Screw & Bolt Corporation. *W. M. Ryan,* representative of the corporation at Chicago, has been elected vice-president, with headquarters at Chicago. The general office of the corporation in New York has been moved from 30 East Forty-second Street, to 30 Rockefeller Plaza.

◆

R. J. VAN METER has been elected vice-president of The Superheater Company, with headquarters at Chicago. Mr. Van Meter received his education in the public schools of Sturgis, Mich., and in special courses in business and engineering. He started his business career in 1902 on the Grand Rapids and Indiana as a locomotive

R. J. Van Meter

fireman. Subsequently he served as traveling engineer and special representative in the transportation department with the Pennsylvania; shop machinist and locomotive fireman with the New York Central; in locomotive service on the Atchison, Topeka & Santa Fe and the Colorado & Southern, and millwright and power plant operator in Denver, Colo., and Ft. Wayne, Ind. He became associated with The Superheater Company on May 1, 1917, and since that time has served as service engineer, special representative, assistant service manager, assistant to vice-president, and manager of western sales and service.

JOSEPH F. CLARY has been appointed head of the railway sales contract department of the Edward G. Budd Manufacturing Company, succeeding the late William T. Bennison, whose obituary appeared in

Joseph F. Clary

the April issue. Mr. Clary joined the Budd Company in 1933, and, as project engineer in the rail-car division, has worked in the design or engineering of all the stainless-steel streamliners built by the company. He is a graduate of the Massachusetts Institute of Technology, 1929, and was previously associated with the Firestone Tire & Rubber Co. His headquarters will be at the Budd, Philadelphia, Pa., plant.

◆

SAMUEL S. BRUCE, JR., has been appointed sales representative of the Duff-Norton Manufacturing Company, with headquarters at the company's general offices in Pittsburgh, Pa.

◆

THE AJAX HAND BRAKE COMPANY, Chicago, has appointed the Portable Plating and Equipment Company, Chicago, its exclusive sales agent for the Ajax hand brake within the United States, effective April 1.

◆

GEORGE H. GOODELL, who for many years has been northwestern sales agent of the National Lock Washer Company, Spring Washer division, has been appointed to also represent this company in the sale of national de luxe windows and car equipment.

◆

INLAND STEEL COMPANY. — *Wilfred Sykes* has been elected president of the Inland Steel Company, Chicago, succeeding *Philip D. Block,* who has been elected chairman of the executive committee. *L. E. Block,* who served as chairman of the board for many years prior to 1940, has been elected chairman of the finance committee. *James H. Walsh,* works manager of Inland's Indiana Harbor works has been elected vice-president in charge of steel works.

CHARLES T. SIEBERT, JR., formerly assistant treasurer and credit manager, has been appointed assistant to the vice-president in charge of sales of the Carnegie-Illinois Steel Corporation, Pittsburgh, Pa.

◆

JOHN H. MCCARTNEY, formerly New York representative, has been appointed manager of sales of the Brake Equipment & Supply Co., of Chicago. Mr. McCartney will make his headquarters at the company's general office in Chicago.

◆

THE INDEPENDENT PNEUMATIC TOOL COMPANY, Chicago, will move its Philadelphia, Pa., branch into its newly constructed buildings at Seventeenth and Fairmount avenues. The company has also recently completed a $500,000 plant in Los Angeles, Calif.

◆

FORREST G. SHARPE, formerly assistant to the sales manager, has been appointed Philadelphia, Pa., sales engineer of the Pangborn Corporation, Hagerstown, Md.

◆

JOHN H. COLLIER, vice-president of the Crane Company, Chicago, has been elected president to succeed Charles B. Nolte, deceased.

◆

DEVILBISS COMPANY.—*Howard P. De Vilbiss* and *Roy A. Guyer* have been elected vice-presidents of the DeVilbiss Company, Toledo, Ohio. Mr. DeVilbiss, son of the founder, has been active in the company since his father's death in 1928, and Mr. Guyer has been sales manager of the spray-painting division.

Obituary

CHARLES B. NOLTE, president of the Crane Company, Chicago, died suddenly on April 29, following a heart attack.

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ALEX T. ANDERSON, district manager, midwestern territory of the Duff-Norton Manufacturing Company, with headquarters at Chicago, died on April 29.

◆

O. C. DURYEA, president of the O. C. Duryea Corporation, New York, died in St. Lukes Hospital, Chicago, on April 27. Mr. Duryea had been ill for three months. He was born in Wyoming, Ill., April 25, 1880, and began his business career in the employ of his brothers manufacturing early automobiles. Before he was 21, however, he had received a number of patents on his own inventions. These were followed by many others. One of the most notable of his inventions was the Duryea railway cushion underframe for which he was awarded the George R. Henderson gold medal by the Franklin Institute of Philadelphia in 1933.

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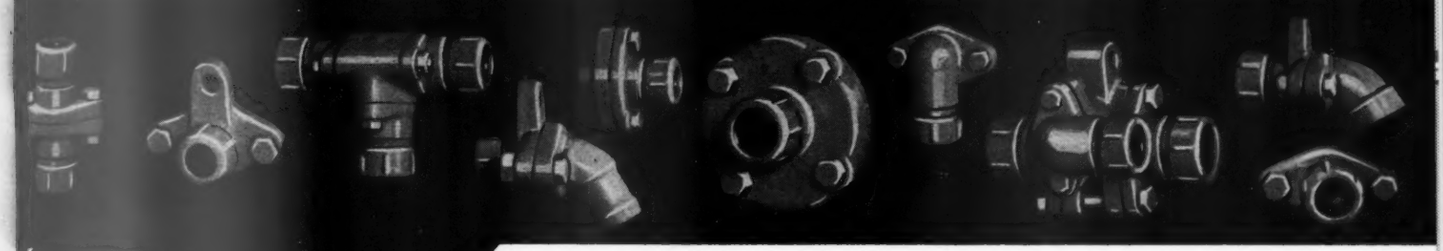

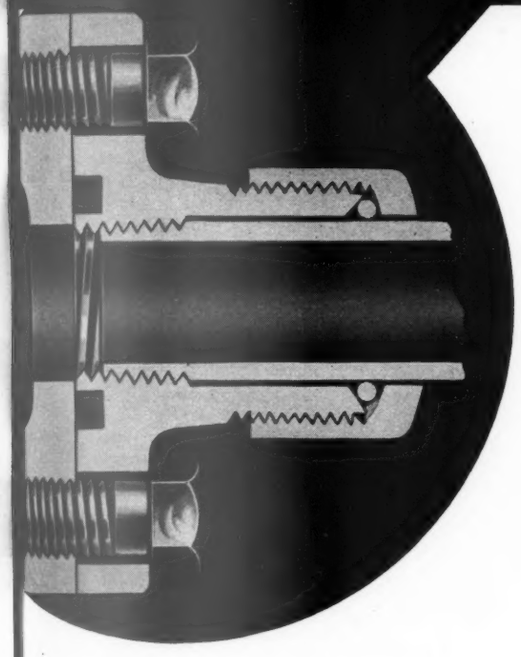

Every "WABCOTITE" Fitting prevents pipe leakage and breakage because it eliminates bending and vibratory strains from the threaded joint. Clamping nut firmly closes anchor ring around pipe at strongest section; flange bolts on metal to metal surfaces; and "WABCO" gasket, under compression, seals the joint

Tight, By Test, for 6 Years

This type of pipe joint was first used on connections to air brake apparatus embodied in a special empty and load brake installed on 2,000 high capacity coal cars many years ago . . . An inspection made after six years service failed to disclose any air leakage whatever at the 400 fittings individually tested. Neither was there any record of broken pipes or maintenance expense at the 12,000 joints on the entire lot of cars ★ This significant record led to the incorporation of "WABCOTITE" Fittings as a standard part of every device on subsequently-developed equipments — the AB, the 8ET, the HSC, and now this feature may be had on main reservoirs, and in tees, elbows, flanges, unions,— all types of pipe fittings for any brake equipment ★ You can install "WABCOTITE" Fittings and be sure they will stay tight and require no time nor expense for maintenance. The resulting advantages in perpetuating reliability of brake performance are noteworthy.

WESTINGHOUSE AIR BRAKE CO.

Personal Mention

General

H. J. STEIN has been appointed engineer of tests of the Atlantic Coast Line, with headquarters at Wilmington, N. C.

R. C. WINNINGHAM has been appointed general mechanical inspector of the South-Central and Northwestern districts of the Union Pacific, with headquarters at Los Angeles, Calif.

DEAN F. WILLEY, whose promotion to general mechanical superintendent of the New York, New Haven & Hartford at New Haven, Conn., was reported in the May issue of the *Railway Mechanical Engineer* was born in Manchester, N. H., and was graduated from Massachusetts Institute of Technology in 1920. Mr. Willey entered railroad service with the New Haven in June, 1920, as assistant engineer, department of tests, and on April 1, 1923, was appointed general material supervisor. In October of the same year he became mechanical inspector and in November, 1923 was appointed foreman mechanical

Dean F. Willey

inspector at Boston, Mass., being promoted to acting general foreman in July, 1924. Mr. Willey became general foreman on November 1, 1924, and on September 16, 1925, was appointed assistant to superintendent of shops at Readville, Mass. He returned to New Haven as special mechanical assistant on May 16, 1930, and was promoted to mechanical superintendent on January 1, 1937.

Master Mechanics and Road Foremen

J. W. MCAULEY, assistant suprintendent and master mechanic of the Canadian National at Prince George, B. C., has resigned.

C. J. SEARS, road foreman of engines on the Chicago Terminal and Logansport divisions of the Pennsylvania, has been appointed road foreman of engines of the Chicago Terminal Division, with headquarters at Chicago.

L. W. KEYSER has been appointed assistant road foreman of engines on the Maryland division of the Pennsylvania.

G. R. STEEVES, locomotive foreman on the Canadian National at Jasper, Alta., has been promoted to master mechanic at Prince George, B. C.

G. S. WEBB, general electrician for the Eastern region of the Pennsylvania, has been appointed assistant master mechanic at Columbus, Ohio.

W. M. MARTIN, engineer, steam locomotive design on the Union Pacific at Omaha, Neb., has been appointed assistant master mechanic at Council Bluffs, Iowa.

M. M. QUINN, assistant road foreman of engines on the Maryland division of the Pennsylvania, has been transferred to the position of assistant road foreman of engines on the Philadelphia division.

J. L. BROSSARD, assistant division master mechanic of the Chicago terminals of the Chicago, Milwaukee, St. Paul & Pacific, has been appointed master mechanic at Aberdeen, S. D.

W. P. PRIMM, assistant train master-assistant road foreman of engines on the Monongahela division of the Pennsylvania, has been appointed road foreman of engines on the Toledo division, with headquarters at Toledo, Ohio.

H. N. ROWLES, road foreman of engines on the Toledo division of the Pennsylvania, has been appointed road foreman of engines on the Logansport division, with headquarters at Logansport, Ind.

Car Department

G. B. GIBSON, assistant master mechanic of the Pennsylvania at Columbus, Ohio, has been promoted to general foreman of the Altoona car shop, Altoona, Pa.

Shop and Enginehouse

H. M. SHERRARD, division master mechanic on the Baltimore & Ohio at Grafton, W. Va., has been appointed superintendent of shops at Glenwood, Pa.

JOHN L. QUINN, night foreman of the Chesapeake & Ohio at Gladstone, Va., has been promoted to the position of general foreman, with headquarters at Gladstone.

WILLIAM MCVICKER, general foreman at the Altoona, Pa., car shop of the Pennsylvania, has been promoted to the position of assistant works manager at the Altoona works.

F. O. FERNSTROM, master mechanic of the Hastings and Dakota division of the Chicago, Milwaukee, St. Paul & Pacific at Aberdeen, S. D., has been appointed shop superintendent at Minneapolis, Minn., with jurisdiction also over the Twin City terminals and the Duluth division.

Purchasing and Stores

THEODORE WHITE has been appointed storekeeper on the Union Pacific at Glenns Ferry, Idaho.

V. W. MITCHELL, chief clerk to the storekeeper at Aurora, Ill., has become general storekeeper of the Fort Worth & Denver City at Childress, Tex.

J. J. JIROUSEK, assistant storekeeper on the Chicago, Burlington & Quincy at Aurora, Ill., has been appointed division storekeeper at Hannibal, Mo.

J. W. SCHWARTZ, division storekeeper on the Chicago, Burlington & Quincy at St. Joseph, Mo., has been promoted to assistant storekeeper at Aurora, Ill.

W. F. MYERS, general storekeeper of the Fort Worth & Denver City, with headquarters at Childress, Tex., has been appointed division storekeeper at St. Joseph, Mo.

Obituary

R. K. CARR, assistant to superintendent motive power of the Norfolk & Western, with headquarters at Roanoke, Va., died on May 4 at the age of 56.

BURTON P. FLORY, who retired on April 1, 1937, as superintendent of motive power of the New York, Ontario & Western at Middletown, N. Y., died on April 29 at Sarasota, Fla., after a short illness, at the age of 67.

ROBERT BLAINE SPENCER, master mechanic of the Southwestern and Western divisions of the St. Louis-San Francisco, with headquarters at West Tulsa, Okla., who died on December 24, as announced in the February issue, was born on July 16, 1884, at Salem, Va. Mr. Spencer entered railway service as a messenger on the Norfolk & Western at Roanoke, Va., in 1899. He served his machinist apprenticeship from 1900-1903 at Roanoke and from 1903-1907, was enlisted in the U. S. Navy. He became a machinist on the Atlantic Coast Line at Waycross, Ga., in 1907; night enginehouse foreman at Thomasville, Ga., in 1908; enginehouse foreman at Waycross in 1909; general foreman at Thomasville in 1911, and general foreman at Savannah, Ga., in 1913. In 1918, Mr. Spencer was promoted to master mechanic. Six months later he went to work in the shipyard of the Foundation Company, Savannah. He reentered the service of the St. Louis-San Francisco at Amory, Miss., in 1920, working successively as a machinist, foreman, and general foreman until 1922. He became enginehouse foreman in the Springfield South shops in 1923 and general foreman at West Tulsa, in March, 1923. Mr. Spencer became master mechanic of the Southwestern division in July, 1925, and later his duties were expanded to include also the Western division.